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Knowledge Creation

Collaborative Research: A Case Study between Biomedical Community of NOVA Medical School and Elderly Community of Arroios

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Dissertação

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Dissertação apresentada para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Comunicação de Ciência, realizada sob a orientação científica da Professora Doutora Maria Inês Queiroz.

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INVESTIGAÇÃO COLABORATIVA: UM CASO DE ESTUDO ENTRE A COMUNIDADE BIOMÉDICA DA NOVA MEDICAL SCHOOL E A COMUNIDADE SÉNIOR DE ARROIOS

ANA RODRIGUES BARROS

RESUMO

PALAVRAS-CHAVE: Investigação Colaborativa, NOVA Medical School, Academia Sénior de Arroios, Comunicação de Ciência

As Instituições do Ensino Superior desempenham um papel fundamental na sociedade como intervenientes ativos na transferência de conhecimento científico válido e podem também contribuir para mudanças sociais. Um dos aspetos essenciais para o desenvolvimento da educação no ensino superior está relacionado com o aumento do envolvimento da comunidade através de dinâmicas colaborativas entre a academia e a população. Estas abordagens colaborativas são importantes para ajudar as comunidades a resolverem os seus problemas com base no conhecimento produzido pelas universidades.

De acordo com a Organização Mundial de Saúde, o número de pessoas seniores está a aumentar dramaticamente em todo o mundo e em Portugal é esperado que a percentagem de pessoas com 60 anos ou mais seja de 41,7% em 2050. Em Arroios, a percentagem de pessoas seniores é de 25,18% e a taxa de analfabetismo é de 2,75%. Nesta freguesia está localizada a NOVA Medical School, uma escola médica que tem como objetivo preparar profissionais e desenvolver investigação em áreas multidisciplinares para resolver problemas de saúde na sociedade. A Unidade EpiDoC é um dos grupos de investigação da NOVA Medical School dedicado à promoção da saúde pública e intervenção na comunidade. Esta unidade lançou um manual prático intitulado *"Viver com Saúde depois dos 60 anos"* para promover estilos de vida saudáveis.

Tendo em conta a proximidade geográfica entre a NOVA Medical School e a Junta de Freguesia de Arroios, bem como a lacuna entre estas duas instituições na área do envelhecimento e da saúde, o presente trabalho tem como objetivo avaliar o livro *"Viver com Saúde depois dos 60 Anos"* como um veículo de comunicação de ciência na comunidade sénior de Arroios. O projeto foi realizado na Academia Sénior integrada na Junta de Freguesia de Arroios e os alunos da academia foram divididos em dois grupos atendendo à sua capacidade de ler e escrever de forma independente.

Foram utilizados métodos quantitativos e qualitativos para analisar o conhecimento inicial dos alunos seniores e o conhecimento adquirido após a oportunidade de ler o livro, bem como para avaliar o livro como veículo de comunicação de ciência. Os resultados obtidos demonstraram que os conteúdos apresentados no livro eram temas já conhecidos pelos alunos seniores, apesar da maioria não se comportar de acordo com esses conhecimentos no seu dia a dia. Observou-se ainda que o livro promoveu comportamentos saudáveis nos estudantes, particularmente na área de nutrição. Em relação à avaliação do livro, o resultado geral foi positivo, exceto para o tópico relacionado com o tamanho e peso do livro.

Em conclusão, este projeto contribuiu para a criação de uma ligação entre a comunidade biomédica da NOVA Medical School a comunidade sénior de Arroios através de uma abordagem colaborativa.

COLLABORATIVE RESEARCH: A CASE STUDY BETWEEN BIOMEDICAL COMMUNITY OF NOVA MEDICAL SCHOOL AND ELDERLY COMMUNITY OF ARROIOS

ANA RODRIGUES BARROS

ABSTRACT

KEYWORDS: Collaborative Research, NOVA Medical School, Arroios Academy for the Elderly, Science Communication

The Higher Education Institutions have a fundamental role in society as active players to transfer valid scientific knowledge and can also contribute for social changes. One of the essential aspects to the higher education development is related to the increase of community engagement through collaborative dynamics between academia and population. These collaborative approaches are important to help communities to solve their questions based on the knowledge produced by universities.

According to the World Health Organization the number of elder people around the world is growing dramatically and in Portugal it is expected a percentage of aged people with 60 years old or over 60 of 41.7% in 2050. In Arroios the percentage of old people is 25.18% and the illiteracy rate is 2.75%. In this parish it is located the NOVA Medical School, a medical school that aims to prepare professionals and to improve research in multidisciplinary areas to solve society's health problems. EpiDoC Unit is one of the research groups at NOVA Medical School dedicated to public health promotion and community intervention. This unit launched a practical handbook entitled *"Viver com Saúde depois dos 60 anos" (Living Healthy after 60 years old)* to promote a healthy lifestyle.

Taking into account the geographical proximity between NOVA Medical School and the Arroios Parish Council as well as the gap between these two institutions in the ageing and health field, the present thesis aims to evaluate the book *"Viver com Saúde depois dos 60 Anos"* as a science communication vehicle in the elderly community of Arroios. The project was performed at the Elderly Academy integrated in the Arroios Parish and the students of the academy were divided in two groups concerning their ability to read and write independently.

Quantitative and qualitative methods were used to analyse the initial knowledge of elderly students and the knowledge acquired after the opportunity to read the book as well as to evaluate the book as a science communication vehicle. The results obtained demonstrated that the contents presented in the book were themes already known by elderly students, although most of them do not behave accordingly to them in their daily lives. It was also observed that the book promoted healthy behaviours in students, particularly in the nutrition area. Regarding the book's assessment the general result was positive, excepting the topic related to the book's size and weight.

In conclusion, this project contributed to the connection between biomedical community from NOVA Medical School and elderly community from Arroios trough a collaborative approach.

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Chapter 1

1. Theoretical Framework on Collaborative Research

1.1 The Role of Higher Education Institutions in Society

Recently, there has been a significant change in the Higher Education Institutions (HEIs) in order to increase community engagement (Taylor, S.M. and Ochocka, 2017).

The HEIs are expected to accomplish three missions: teach, research and serve (Escrigas et al., 2014). In these three different areas, the most essential and critical task is to serve as society's primary engine of knowledge production and preservation (Tremblay, 2015). However, the mission of "service" is seen as being independent of teaching and research. Generally, it is assumed that the knowledge will be transferred from the HEIs to communities and will thus help them to solve their questions. However, no assumptions are made that community engagement probably might contribute to HEIs improvements in teaching and research activities (Escrigas et al., 2014).

In a historical perspective, the knowledge produced by universities is considered the best and the most legitimate. These institutions are also regarded to hold the competence to decide which knowledge is valid (Tremblay, 2015). However, in the 5th GUNi Report focused on *"Knowledge, Engagement and Higher Education: Contributing to Social Change",* the authors looked to understand the roles of HEIs as active players in contributing to social change. This report offered several elements for a renewed relationship between higher education, knowledge and society (Escrigas et al., 2014). Furthermore, one of the most significant trends in higher education over the last years was critically examined: the evolution of the theory and practice of engagement as a fundamental key in the higher education development (Escrigas et al., 2014).

There are numerous concepts related to the term “engagement” and all are associated to new considerations regarding the production and use of knowledge in society, increasing the idea of its social impact (Escrigas et al., 2014).

1.2 Community-University Engagement

Community-university engagement (CUE) is a concept that can be applied to a wide range of activities, as well as, to a certain view of the role that university has to play in society (Escrigas et al., 2014). The concept of “engagement” implies activity, sharing and a dynamic that is in constant transformation. It implies relationships between universities and communities at several levels such as local, regional, national, international or even virtual level (Tremblay et al., 2015). The community-university engagement is seen as an essential outreach commitment of universities and as a support to address difficult subjects affecting communities. This significant modification has internal and external drivers. On the one hand, the internal driver is related to the greater sense of social responsibility by the universities while on the other hand, the external driver is associated to funding agencies, especially governments. These agencies have required perceptible measures of returns on the investment of public funds, and as communities have wanted to partner with universities to address priority societal issues (Taylor, S.M. and Ochocka, 2017). In this perspective, community-based research (CBR), with the broader domain of community-university engagement activities, has gained adoption (Tremblay et al., 2015). There are numerous terms used to describe research approaches related to community-engagement, however, it is community-based research that has been used (Escrigas et al., 2014).

1.3 Collaborative Research Concept

The interest in collaborative research has been increasing between academia and science policy circles (Katz & Martin, 1997). Although there are several definitions and terms used to describe collaborative research, the present general introduction will

focus on the definition of *"community-based research"* and *"community-based participatory research".*

1.3.1 Community-Based Research

Community-based research (CBR) is a collaborative research approach that can be define in several ways and take different shapes. There is a wide range of functional structures that support engagement practices and can be developed as communities-based research (Tremblay, 2015). Although there is a great diversity of terms to describe CBR a possible definition can be found in Strand et al., 2003:

"…community-based research (CBR) involves research done by community groups with or without the involvement of a university. In relation with the university CBR is a collaborative enterprise between academics and community members. CBR seeks to democratize knowledge creation by validating multiple sources of knowledge and promoting the use of multiple methods of discovery and dissemination. The goal of CBR is social action (broadly defined) for the purpose of achieving (directly or indirectly) social change and social justice."

1.3.2 Community-Based Participatory Research

Community-based participatory research (CBPR) is a model in which the research process itself is proposed to help research participants and the communities in which they live (Blumenthal, 2011). In the *Evidence Report/Technology Assessment* prepared for Agency for Healthcare Research and Quality (AHRQ) the definition for CBRP is (Viswanathan M, et al., 2004):

"Community-based participatory research is a collaborative research approach that is designed to ensure and establish structures for participation by communities affected

by the issue being studied, representatives of organizations, and researchers in all aspects of the research process to improve health and well-being through taking action, including social change."

The main goal of this approach is to create an effective dynamic process that will enhance bidirectional connections between academics and communities that they study. Moreover, in CBPR, there is a close connection among the academic pursuit of generalizable knowledge and the use of that knowledge for action at the local level (Hacker, 2013).

Research including communities has not always involved community partners in a participatory or collaborative way. The use of communities in research may be done by understanding the community as a laboratory (Hacker, 2013). This type of approach is used in health and environmental research to enhance the value of the studies for both researchers and the studied community (Viswanathan M, et al., 2004). It is particularly attractive, for academics and public health professionals, to address the persistent difficulties of health care disparities in several populations, such as social or economic status, lack of health insurance, or the integration in various racial and ethnic groups (Council, 1988 and Green & Mercer, 2001).

Community-based participatory research can contribute to help community participants, health care practitioners and researchers as this approach creates bridges between scientists and communities through the use of shared knowledge and valuable experiences (Israel et al., 1989; Hall, 1992 and Butterfoss et al., 1993).

This kind of collaboration further lends itself to the development of proper measurement instruments to make projects more effective and efficient (Altman, 1995). Moreover, with CBPR approach it is established a mutual trust that promotes both the quantity and the quality of data collected (Schensul, 1985; Brown, 1995 and Schulz et al., 1998). Another benefit of such collaboration is a deeper understanding of a community's single circumstances and a more accurate framework for testing and adapting best practices to the community's needs (Altman, 1995; Green & Mercer, 2001; Hall, 1992 and Schensul, 1985). In this context CBPR is an approach that combines research methods and community capacity building strategies to link the gap

between the knowledge produced through research and its application into interventions and policies (Green & Mercer, 2001; Kaplan, 1992; Mittelmark et al., 1993; Aguirre-Molina & Gorman, 1996; Israel et al., 1998; Davis & Reid, 1999; Wallerstein & Bernstein, 1994; Goodman et al., 1998 and Cornwall & Jewkes, 1995).

Chapter 2

2. Ageing and Health

"At a time of unpredictable challenges for health, whether from a changing climate, emerging infectious diseases, or the next microbe that develops drug resistance, one trend is certain: the ageing of populations is rapidly accelerating worldwide. For the first time in history, most people can expect to live into their 60s and beyond. The consequences for health, health systems, their workforce and budgets are profound."

Dr Margaret Chan

Director-General

World Health Organization (WHO, 2015)

2.1. Global and Portugal trends in Population Ageing

The number of elder people in populations around the world is growing dramatically (WHO, 2015). Figure 1 and Figure 2 demonstrate the proportion of people aged 60 years or older by country in 2015 and the projections for 2050.

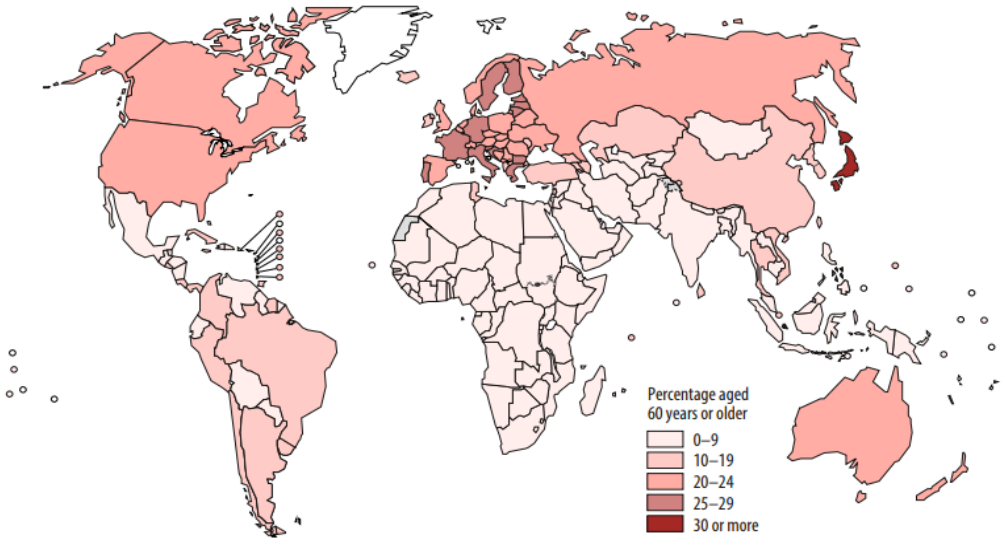

Figure 1: Proportion of population aged 60 years or older, by country, in 2015. Extracted from World Report on Ageing and Health (WHO, 2015).

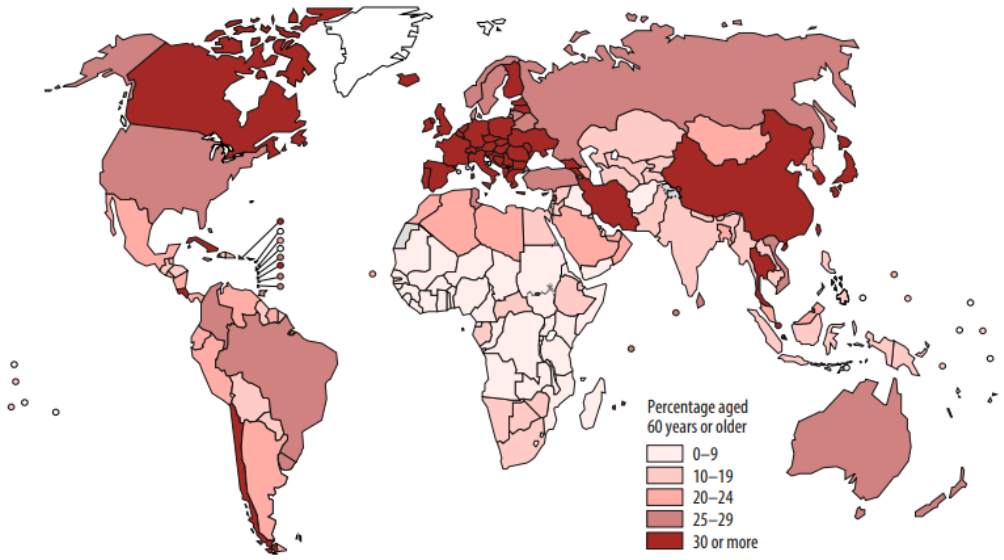

Figure 2: Proportion of population aged 60 years or older, by country, in 2050. Extracted from World Report on Ageing and Health (WHO, 2015).

According to the United Nations Report on *World Population Ageing 2017 – Highlights*, the global population aged 60 years old or more counted 962 million in 2017, more than twice as large as it was in 1980 when there were 382 million old people in the world. It is expected that the number of older people worldwide doubles again by 2050, when it is projected to reach nearly 2.1 billion (United Nations, 2017).

In Portugal, the number of people over 65 years old has also been growing (Table 1). In 1981 they were 1 132 638 (11,5%) and by 2016 the number of elderly people nearly doubled to 2 158 732 (20.9%) (PORDATA, 2018).

Table 1: Summary table with the number of resident population and the number and percentage of elderly people (65 years old and over) in Portugal. Data extracted from PORDATA official website.

	1981	**1991**	**2001**	**2011**	**2016**
Resident population (thousands)	9 851 3	9 960 2	10 362 7	10 557 6	10 325 5
Elderly people (65 years	1 132 638	1 372	1 705	1 992	2 158

and over)		543	274	034	732
Elderly people (%) 65 years and over	11.5	13.8	16.5	18.9	20.9

Recently data from United Nations Report demonstrated that in Portugal, during 2017, the percentage of aged people with 60 years old or over 60, was 27.9% and it is expected that this percentage will increase to 41.7% in 2050. In relation to the median age of the Portuguese population, in 2015 an average of 44 years old people was registered while it is predictable to reach an average of 53 years old people by 2050 (see Table 2) (United Nations, 2017).

Table 2: Demographic indicators related to population ageing. Adapted from World Population Prospects: The 2017 Revision (United Nations, 2017).

	Population aged 60 years or over (thousands)		**Percentage aged 60 years or over**		**Median age of the population (years)**	
	2017	**2050**	**2017**	**2050**	**2015**	**2050**
Portugal	2880	3748	27.9	41.7	43.9	53.1

2.2. Drivers of Population Ageing

The global ageing is in fact a great triumph because it represents a success story for public health as well as social and economic development (WHO, 2002). There are two main drivers for population ageing. The first one is related to increasing life expectancy (on average, people are living longer) and the second one due to the falling of fertility rates (WHO, 2015). The improvements in survival to older ages have contributed to population ageing (Lee & Zhou, 2017 and Murphy, 2017). Since 1950-1955 the life expectancy at birth has increased by more than 10 years in Europe and it is expected that will exceed 80 years in the coming decades (United Nations, 2017).

Nevertheless, the declining in fertility has been indicated as the most influential factor in shaping trends in the number of older people in the world (Lee & Zhou, 2017 and Murphy, 2017). As populations grow older, it is essential to design innovative policies and public services specifically targeted to older people, including policies addressing housing, employment, health care, infrastructure and social protection, among others (United Nations, 2017). Elderly people contribute to society in several ways such as in their families, in their local communities or to society more broadly. However, all the opportunities available to elderly people will be heavily dependent on one key characteristic – **health** (WHO, 2015).

2.3. Healthy Ageing

Healthy Ageing is defined by World Health Organization (WHO) as the process of developing and maintaining the functional ability that allows well-being in older age (Figure 3) (WHO, 2015). In brief, this process starts at birth with the genetic inheritance. However, to born in a specific social context might also influence the personal characteristics. These personal characteristics include those that are normally fixed such as sex and ethnicity, as well as those related with occupation and educational environment for example. It contributes to have a social position in a particular context and time, which shapes the opportunities and barriers, as well as the access to some resources. With the ageing process, people experience a gradual accumulation of molecular and cellular damage that results in a general reduction in physiological reserves. The phenomenon of physiological changes is basically inevitable, although their extent will vary significantly among individuals at any particular chronological age. The exposure to positive or negative environmental influences during life can influence the development of other health characteristics. It is the interaction among these health characteristics that will determine the intrinsic capacity of the person (the composite of all the physical and mental capacities that an individual can draw on). Nevertheless, the interaction with the environment is also a key in this process because it is the combination of the individual and their

environment and the interaction between them, that builds the individual's functional ability (WHO, 2015).

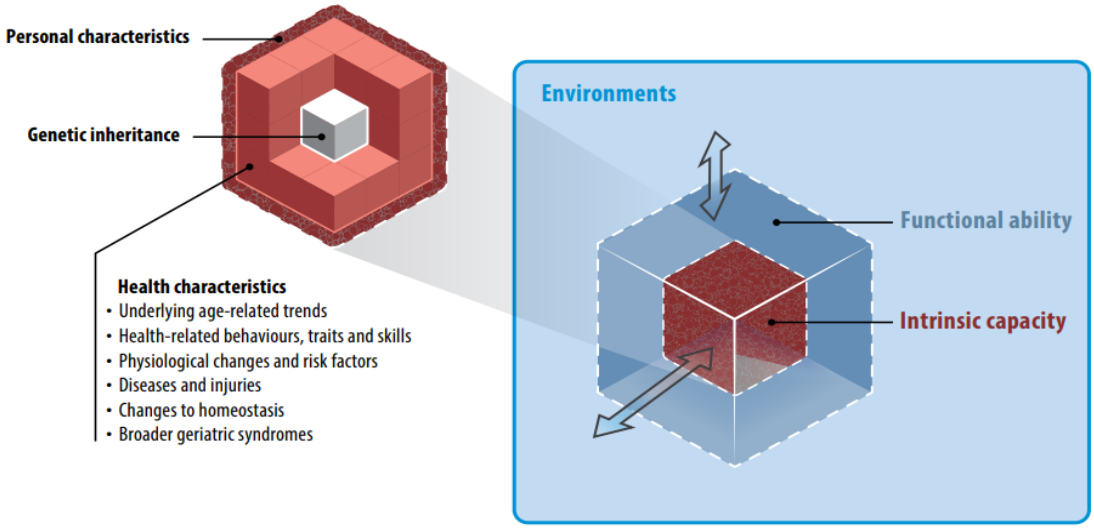

Figure 3: Healthy Ageing. Extracted from World Report on Ageing and Health (WHO, 2015).

2.4. Active Ageing

The World Health Organization adopted the term "Active Ageing" to express the process of optimizing opportunities for health, participation and security in order to improve life quality in elderly people (WHO, 2002). This vision represents a more inclusive message than "healthy ageing" and identify other factors, in addition to healthcare, which are related with the way that individuals and populations age (Kalache & Kickbusch, 1997). Active Ageing is an approach that allows people to realize their potential of physical, social, and mental well-being throughout the life course and to contribute in society according to their needs, desires and capacities (WHO, 2002). In the Report *Active ageing: a policy framework* released by World Health Organization, six key determinants of active ageing were identified: economic ones, health and social services, behavioural, personal, physical, and the social environment (Figure 4) (WHO, 2002). Moreover, culture and gender are also defined as cross-cutting

determinants within the framework to understanding active ageing. In fact, the culture which surrounds people shapes the way in which we age because it influences all the other elements of active ageing. On the other hand, the gender works like a "lens" trough which to consider the appropriateness of several policy options and how they will affect the well-being of men and women (WHO, 2002).

Figure 4: The determinants for Active Ageing. Extracted from *Active ageing: a policy framework* released by World Health Organization (WHO, 2002).

Chapter 3

3. Case Study between Biomedical Community of NOVA Medical School and Elderly Community of Arroios

3.1. Contextualization and Rationale

Arroios has 7 964 old people (65 years and over) out of a total of 31 634 people residing in the parish, according to the Statistics Portugal. The illiteracy rate of this population is 2.75%, which means that 814 individuals aged 10 and over don't know to read or write (INE, 2011).

In the parish there is a Medical School – NOVA Medical School (NMS), that aims to prepare professionals in the areas of medical sciences and other health fields. Besides that, this school has associated research centres to improve research in multidisciplinary areas and to solve society's health problems.

One of the groups that dedicates their research to public health promotion and community intervention is the EpiDoC Unit. This unit has been developing several projects including the project "*Saúde.Come* – Promoting Food Security".

Saúde.Come aims to create valid information on food insecurity in Portugal through new technologies for vulnerable groups. This project involved a home-based intervention program to decrease food insecurity in elderly people using a TV app. The objective of this work was to present a protocol for an educational and motivational TV-based intervention to promote healthy lifestyles as well as to reduce food insecurity in Portuguese elderly population (Rodrigues et al., 2017). The interactive TV app consisted in a 12-week home based intervention with weekly themes (see Table 3) and daily content in video format: 1) The Nutrition Corner (nutrition and diet tips); 2) A + Noble Kitchen (healthy, easy to cook and low-cost recipes); 3) Move + in your Home (physical exercise programs). Additionally, brief reminders on health behaviours were also broadcasted through the TV app (Rodrigues et al., 2017).

After conducting the 12-week home-based intervention for elderly, EpiDoC Unit decided to launch the book *"Viver com Saúde depois dos 60 anos*" (Living Healthy after 60 years old)[1] as a complement and to make the 12-week program available to anyone.

3.2. The book *"Viver com Saúde depois dos 60 anos"*

"Viver com Saúde depois dos 60 anos" is a practical handbook to promote a healthy lifestyle and to maintain an active and healthy life. It is constituted by five introductory chapters and then a 12-week program. Each week is divided in the following sections: **Nutrition Corner**; **A + Noble Kitchen**; **Move + in your Home**; **Brain + Active**; **Learn + with the Specialist**, and in every week there is a different theme as shown in Table 3.

Table 3: Themes for each week of the 12-week program available at the TV app and in the book. Extracted from Rodrigues et al., 2017.

Week	Theme	Content
1	**Vegetable week**	Health benefits of vegetable consumption Recommendations for vegetable intake How to increase the daily intake of vegetables
2	**Water week**	Water, hydration, and health Recommendations for water intake Food resources that contain water
3	**Milk week**	Health benefits of consumption of milk and other dairy products Recommendations for milk intake
4	**Olive oil week**	Olive oil as a healthy cooking oil option Adequate amounts for using olive oil for food preparation and cooking

[1] Free translation of Portuguese language

5	**Fruit week**	Health benefits of fruit consumption Recommendations for fruit intake
6	**Salt week**	Health risks of salt intake Recommendations for salt intake Foods with high and low salt content Strategies to reduce salt intake
7	**Meat, seafood, and eggs week**	Importance of consuming adequate amounts of meat, seafood, and eggs Adequate portions of meat, seafood, and eggs Healthier food options within the different foods of this group
8	**Vegetable soup week**	Health benefits of vegetable soup consumption Standard recipe for a healthy vegetable soup
9	**Vegetable and fruit week**	Health benefits of vegetable and fruit consumption Recommendations for vegetable and fruit intake Meeting vegetable and fruit intake recommendations How to choose the low cost options for these foods
10	**Healthy cooking week**	How to cook healthy food
11	**Sugar week**	Health risks of sugar intake Recommendations for sugar intake Foods with high and low sugar content
12	**Pulses week**	Health benefits of pulses consumption Recommendations for pulses intake How to include pulses in your diet daily intake

An online version of the book can be found here: http://cedoc.unl.pt/wp-content/uploads/2018/01/Livro_SaudePontoCome_20dezembro2017.pdf

3.3. Research Question

The interactive app was used to collect data to evaluate the 12-week intervention (Rodrigues et al., 2017). However, the practical handbook *"Viver com Saúde depois dos 60 anos"* has not been evaluated. Thus, the research question of the present thesis is based on the need to verify if the book *"Viver com Saúde depois dos 60 anos"* is a good science communication vehicle for the elderly population. In other words, if the knowledge related to a healthy lifestyle and an active life is well broadcasted to the book's target – the elderly.

As described in the beginning of this chapter, Arroios parish has about 25% of old people and an illiteracy rate of 2.25% (INE, 2011). Considering the geographical proximity between NOVA Medical School and the Arroios Parish Council as well as the gap between these two institutions concerning the health field, the present work aims to evaluate the book through the elderly population from Arroios. In this context and once there is an Academy for the Elderly integrated in the Arroios Parish Council, the objective is to use the students from it, to verify if the book is an efficient science communication vehicle. Regarding the high illiteracy rate in Arroios, the Academy has two types of classes: classes for illiterate students to teach them how to read and to write and general classes which include several areas such as Informatic, English, Music, History, Health, Arts, Italian, French, Theatre, Literature, Psychology, Culture, Economics, among others.

3.4. Aim

The focus of the present work was to create a link between the knowledge produced by the research developed in NOVA Medical School in the ageing field and the elderly community that lives in the Arroios parish. For that, a case study was used between EpiDoC Unit and the Arroios Academy for the Elderly through the evaluation of the book *"Viver com Saúde depois dos 60 anos".* Moreover, it is expected to promote healthy behaviours in the academy students as well as to promote collaborative research dynamics between the biomedical community of NOVA Medical

School and the elderly population of Arroios. The Figure 5 summarizes the contextualization, the rationale, the research question and the target as well as the aim of the present thesis.

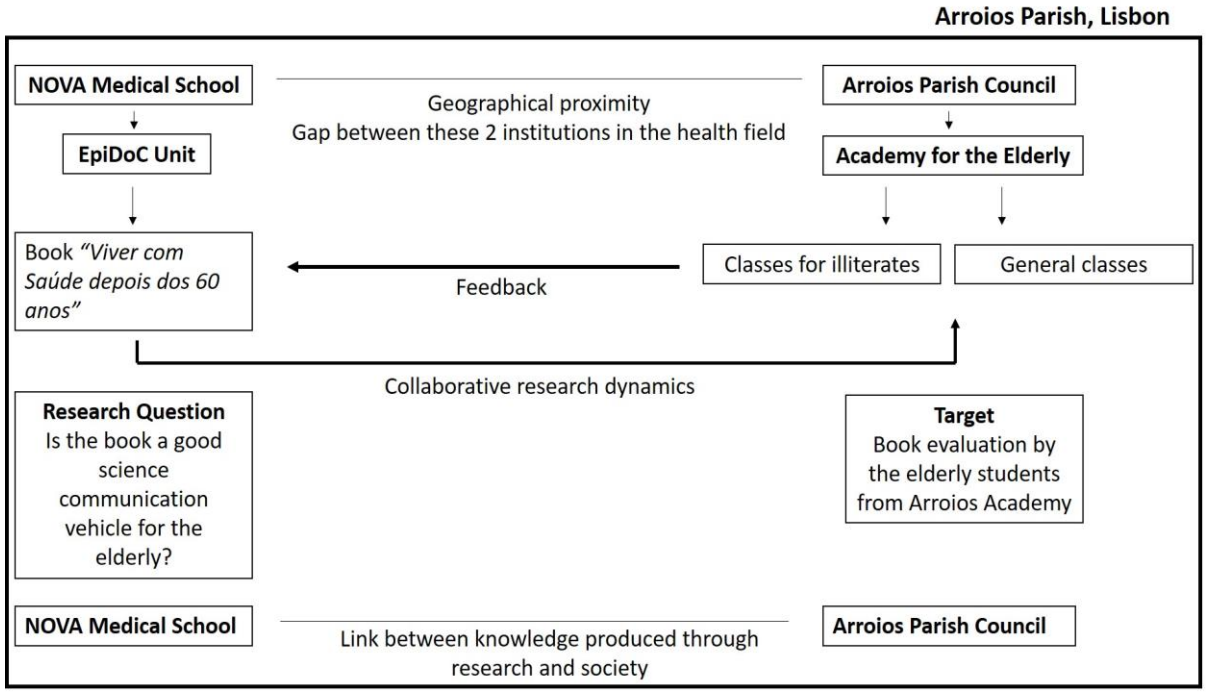

Figure 5: Schematic description of the contextualization, rationale and aim of the present thesis.

3.5. Description of Entities Involved in the Case Study

3.5.1. NOVA Medical School (NMS)

NOVA Medical School is an academic unit of Universidade NOVA de Lisboa existing since 1977. This Medical School is located at *Campo Mártires da Pátria* integrated in Arroios Parish Council. NMS has 1 671 students in the Integrated Master's Degree in Medicine, 569 postgraduate students and a total of 546 professors and researchers. Currently, there are two research centres associated to NOVA Medical School that strongly contributed to the development of the school's research:

CEDOC – *Chronic Diseases Research Centre*

CEDOC is dedicated to research and innovation in the biomedical field in chronic diseases. The aim of this institute is to combine clinical, epidemiological

research and services in chronic diseases with fundamental research applied to biomedical research, stimulating the multidisciplinary approach, promoting the development of networks with national and international partners and contributing to the development of new technologies.

TOXOMICS – *Centre for Toxicogenomics and Human Health*

TOXOMICS contributes in the fields of environmental genotoxicity and molecular epidemiology as well as to genetic determinants in health and disease. Its mission turns around prevention and susceptibility to disease and advanced training in toxicogenomics and human health.

3.5.2. EpiDoC Unit

EpiDoC Unit is an epidemiologic, clinical and outcome research unit located at CEDOC-NMS and promoted by NOVA Saúde[2]. The aim of EpiDoC is to provide scientific information of excellence on health and diseases issues and cover clinical, social, economic and human aspects of chronic non-communicable diseases. To measure health condition and conduct interventional studies EpiDoC creates, tests and applies innovative forms through new information and communication technologies, such as online platforms, apps and interactive TV. EpiDoC is also dedicated to help patients and vulnerable population groups to improve their health, specifically in health promotion of ageing.

This research unit is pioneer on promoting education and training strategies using information and communications technologies such as internet, apps and smart TV tools. Another aim of EpiDoC is to contribute to patient's empowerment, to decrease inequities in health and to offer evidence for public health policies targeting old people. In this context, the main activities developed by EpiDoC Unit are research; training and education activities; services to the scientific community; clinical research communication, diffusion, networking and collaboration.

[2] NOVA Saúde is a programme from Universidade NOVA de Lisboa that aims to improve internal knowledge and promote collaborations between NOVA's academic units.

3.5.3. Arroios Academy for the Elderly

The Arroios Parish Council integrates the Active and Healthy Ageing project for physical, social and mental welfare of its elderly population. This initiative covers several activities with the aim to combat isolation and social exclusion of the population with more than 55 years old residing in the parish. The project is based on active ageing concept adopted by the World Health Organization (WHO, 2002) which assumes the individual's understanding of their potential for lifelong physical, social and mental well-being, considering their needs, desires, abilities and involvement with the community in which they are inserted. To promote good practices for Active and Healthy Ageing, the Parish Council of Arroios organizes the Movement Classes, Art Workshops, Cultural Tours and Arroios Academy for the Elderly. The Arroios Academy for the Elderly offers a wide range of theoretical and practical subjects as well as social and cultural activities. The focus of this senior academy is to be a space of teaching and sharing to insert elderly students in a place where their knowledge is valued and expanded.

Chapter 4

4. Methodology

4.1. Research Approach

The present work involved the integration of quantitative and qualitative methods to answer the research question. The combination of both methods has become unremarkable in the last years (Bryman, 2006). Quantitative research can be used to determine how many individuals undertake certain behaviours, for example (Sutton & Austin, 2015). On the other hand, qualitative research methods can be used to support investigators to access the thoughts and feelings of people in the study. This methodology can allow the development of an understanding of the meaning that participants attribute to their experiences (Sutton & Austin, 2015).

As quantitative methods, two different inquiries applied to students in two different times were used, at the beginning and at end of the project. The formulation of the questions was based on the literacy rate in the parish, thus the questions presented were very simple. The aim of the inquiries was to observe the initial knowledge concerning the subjects related to an active and healthy live and the knowledge acquired after the opportunity to read the book *"Viver com Saúde depois dos 60 anos".*

At the end of the project qualitative methods were also performed as interviews to confirm and clarify some aspects of the results obtained by the inquiries.

4.2. Data Collection

The Active and Healthy Ageing project of the Arroios Parish Council integrates 102 senior students in several activities with the aim to combat the isolation and social exclusion of the elder population residing in the parish. Sixty-four students participated in the present study. Concerning the illiteracy rate in the parish there are two types of classes at the Academy for the Elderly: classes for illiterate students and

general classes which include several areas from Informatics to Economics for example. In this context, two different groups were defined in the implementation of the project - Group A (n=17) included students from literacy classes and the Group B included students from general classes (n=47). The principle for the definition of the groups was based on the ability of students to read and to write independently.

For the realization of the present study EpiDoC Unit provided 20 books. The access to the book *"Viver com Saúde depois dos 60 Anos"* was also different for the groups. The students from the Group A had access through their literacy classes with the cooperation of the teachers while the students from Group B had access to the library (n=23) and at their homes (n=18). Since there weren't enough books, the students were exchanging the books between themselves during the project.

The study was performed over a 3-month period, during which the project was presented to the elderly students at the Arroios Parish Council and the inquiries and interviews were carried out.

Initially, the project was presented to students and all doubts were clarified. The details of the project, including the aims, methodology and procedures were provided in written format and discussed with each participant (see Annex a) as described in Rodrigues et al., 2017. After presentation and discussion, the students were asked to sign a written informed consent (see Annex b). A copy of the signed and dated consent form was given to all participants.

To analyse the knowledge regarding the contents of an active and healthy live, an initial inquiry was distributed to all students that accepted to participate in this work (see Annex c). Then, the students got free access to the book *"Viver com Saúde depois dos 60 Anos"*, in between the middle of December 2017 until middle March 2018. The second step in the data collection was the distribution of the final inquiry (see Annex d) to verify if the book had any impact in people's knowledge. The structure of both inquiries was almost the same, although the questions were different in these two moments of evaluation. Basically, the first inquiry was divided in 5 groups of questions and the final inquiry was divided in 7 groups of questions. The 2 different groups of questions in the final inquiry were related to the mode how students had access to the book and how they evaluated the book. In relation to the other

questions, the groups concerning the themes: 1) general information, 2) nutrition corner; 3) Move + in your Home; 4) Brain + Active and 5) Learn + with the Specialist.

It were carried out 4 semi-structured interviews to explore the participants' understanding of the project (see annex e). The focus of the interviews was to verify what participants have gained from the participation, the perceptions of their role in the study, their concerns regarding this project and their suggestions for improvement (Stacy & Spencer, 1999).

The interviews were performed at the end of the project and each one of them took about 20 minutes. These interviews were audio-recorded and later transcribed verbatim before performed the data analysis as described in Newington & Metcalfe, 2014. Furthermore, observational notes were handwritten in a small notebook at the same time that the interview took place to supplement the data analysis (Stacy & Spencer, 1999). The field notes allowed the researcher to maintain the environmental context and nonverbal cues that may not be adequately captured during the audio-recording (Sutton & Austin, 2015).

4.3. Data Analysis

Quantitative variables were summarized by descriptive statistics such as average, standard deviation, median, minimum and maximum and qualitative variables were summarized by calculating absolute (n) and relative (%) frequencies. Comparison of groups (Group A - students from literacy classes versus Group B – students from general classes) against qualitative variables were tested using Chi-Square test or Fisher test (where applicable).

The statistical tests were performed considering a level of significance of 5%. Statistical analysis of data from inquiries were performed using statistical software IBM® SPSS® Statistics 23. The interview data was analysed using MAXQDA after the transcription to categorize, theorize and explore the contents of the interviews.

Chapter 5

5. Results and Discussion

5.1. Sociodemographic Characteristics of Students from Arroios Academy for the Elderly

Sixty-four students from Arroios Academy for the Elderly agreed to participate in the current work out of a total of 102 enrolled students. Table 4 summarizes sociodemographic characteristics of participants based on age, gender and education level for the two groups: A – students of literacy classes (n=17) and B – students of general classes (n=47).

This Senior Academy is available to any person over 55 years old residing in the parish, however, younger students are also accepted. The average of age was about 69 years old, with a minimum of 39 years and a maximum of 84 years registered in illiterate students from group A. The minimum observed is justified because in the Arroios parish exists a great number of young people without any level of education who attend literacy classes in the Academy (INE, 2011).

Most of the participants were females 51 (79.69%) while the male participants were 13 (20.31%). Moreover, in the group A there are no male students. In relation to the education level, it was verified that 28 (45.16 %) had 4 or less years of education and just 10 (16.13 %) pursued to a higher education.

"In this Academy we have all kinds of people, some of them with many years of education and others that do not even have the fourth class. However, I was very surprised when I found out that most of my classmates only had the fourth class."[3]

(student, 70 years old)

[3] Free translation of Portuguese language

Table 4: Sociodemographic characteristics of students from Arroios Academy for the Elderly that participated in the present study. Quantitative variables summarized by average, standard deviation, median, minimum and maximum. Qualitative variables summarized by absolute (n) and relative (%) frequencies. Group A (n=17) – students of literacy classes; Group B (n=47) – students of general classes.

	A	**B**	**Total (n=64)**
Age (years)			
N	17	47	64
Average	69.24	69.35	69.32
Standard Deviation	13.49	7.42	9.32
Median	75	70	70.00
Min	39	47	39
Max	84	83	84
Gender, 64 (100 %)			
Male	0 (0%)	13 (27.7%)	13 (20.31 %)
Female	17 (100%)	34 (72.3%)	51 (79,69 %)
Education level, 62 (96.9%)			
0 - 4 years	17 (100%)	11 (24.44%)	28 (45.16 %)
5 - 9 years	0 (0%)	12 (26.27%)	12 (19,35 %)
10 - 12 years	0 (0%)	12 (26.37%)	12 (19,35 %)
> 12 years	0 (0%)	10 (22.22%)	10 (16,13 %)

5.2. Nutrition Corner

In the first inquiry the themes were related to nutrition and water consumption, salt *versus* aromatic herbs and vegetables *versus* animal origin products (see Annex c). The final inquiry comprised questions about the way we should start meals, the most beneficial drinks for health and the fat used in food preparation (see Annex d).

Generally, students from both classes, correctly answered most of the questions in the two surveys and no significant difference between groups A and B was registered. However, in the question *"What is the best option for seasoning food?"*

from first inquiry, significant differences were found between the groups ($p<0.001$, Fisher Test). While 76.5% from illiterate students choose salt as the right answer instead of aromatic herbs, the group of students that attend the general classes select aromatic herbs as the correct response (86.7%) (see Figure 6).

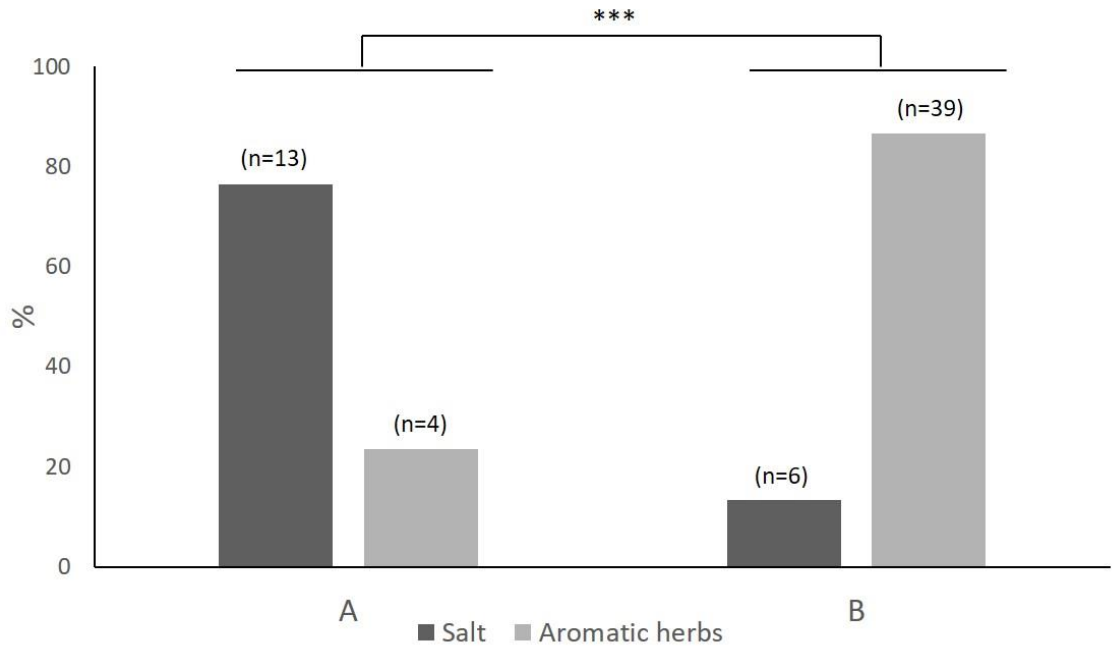

Figure 6: Comparison of the answers from Group A (n=17) – students of literacy classes and Group B (n=47) – students of general classes, to the question *"What is the best option for seasoning food?".* *** Represents the significant differences found between the group A and group B ($p<0.001$, Fisher Test).

In the question *"Do you know how many glasses of water you should drink per day?"*, the answer *"Yes"* was chosen 100% in group A and 87% in group B. Still, when students were asked to tell how many glasses they should drink per day, the answers varied from 2 glasses until 20 glasses, but the majority was familiar with the answer of 8 glasses per day. The theme of water was a pertinent subject discussed by students during this project throughout the book. For example, there was a student that before reading the book said *"(…) from what I heard we should not drink water at the meal.".* In the book (page 101), it is clarified the quantity of water per day which includes drinking water during the meals. Nevertheless, after reading the book the same

student said *"Concerning the issue of water, I didn't use to drink almost nothing, and then I started drinking a lot. And I know there are people who started drinking as well."*

For the question *"What should be consumed in greater quantity?"*, "*vegetables*" was the chosen answer by 76.5% in group A and 100% in group B. However, during the project, several people confessed that even though they knew that they should eat more products of plant origin, they still eat more animal products.

In the final inquiry both groups answered in the right way to the questions, with more percentage of correct answers, for example in the question *"Which fat should be used in food preparation?"* the two groups chose 100% *"Olive oil".*

Even though the questions were not the same in the two inquiries, the structure and difficulty level were the same. Group A answer correctly with 100% to all questions in nutrition section. Here, it is necessary to point out that students from literacy classes were helped by teachers to answer all the questions.

5.3. Move + in your Home

Physical exercise section in the first questionnaire, was associated to the exercise's benefits, the tools available at home to exercise and the relation between physical exercise and a better night's sleep (see Annex c). In the final inquiry the questions were about physical activity and joints, utensils to do exercise at home and daily tasks where it is possible to practice exercise (see Annex d). The groups answered correctly in both inquiries, without significant differences between the groups, and without any doubts regarding the importance of physical exercise in the promotion of a healthy life.

In the question *"Do you think that physical exercise can be performed at your home using tools already available?"* from the first inquiry, only 1 person (6.3%) from group A and 4 people (9.8%) from group B answered *"No".* This topic was also asked in the final inquiry through open answer to verify which utensils were referred by the elderly. The answers from group A to this question were mainly "*broom*", "*chair*" and "*vacuum cleaner*", while the group B gave more suggestions such as "*plastic bottles*", "*floor*", "*walls*" and "*stairs*". On the other hand, some people from group B also

considered that in their homes nothing could be used to do physical activity. It was also requested in the final inquiry to describe in which daily tasks the physical exercise could help. Group A answered mainly "*housework*" as the principal task where physical activity is important. In group B, housework was also referred, as well as walking and climbing stairs. Welfare, mobility and agility were also highlighted by group B.

To the question *"Do you relate the practice of physical exercise to a better night's sleep?"* only 7 people from group B (15.5%) considered that physical exercise is not relate to a better night's sleep, while group A answered 100 % "*Yes".*

The section "Move + in your Home" in the book was one of the most welcomed and commented by the students, mainly because of the simplicity of the exercises and the good illustrations (see Figure 7 as example).

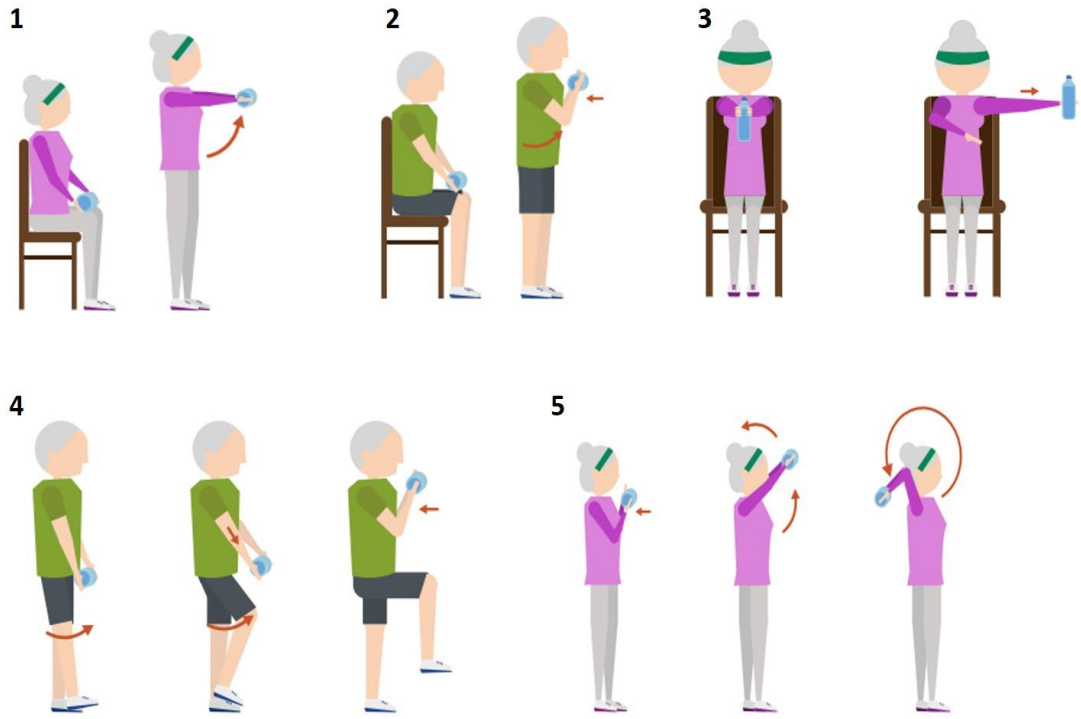

Figure 7: Examples of physical exercices adapted from the pratical handbook *"Viver com Saúde depois dos 60 Anos"* (pages 333, 334, 335 and 336).

"(…) A few days ago, I was laughing with my husband because the exercises we did at the gym could be done at home."[4]

(student, 69 years old)

"The part of the exercises is very interesting for those who do not go to a gymnasium."[5]

(student, 70 years old)

5.4. Brain + Active

The section "Brain + Active" was related to the mental health subjects and in the first inquiry the questions were about the use of mind actively, ways to preserve memory, language and decision-making ability and the importance of share stories (see Annex c). The questions of the final inquiry included the preservation of the memory, the exercises to stimulate mind and the sharing of experiences in group (see Annex d).

Once again, it was observed that group A and group B answered correctly to the questions from both inquiries, with no significant differences observed between the groups.

In the question *"Do you feel that if you use your mind actively, it will be easier to solve day-to-day problems?"* (first inquiry), only 1 person from group B (2.4%) chose *"No"* while 100% of group A selected *"Yes".* The same pattern was observed in the question *"Do you think there are ways to preserve your memory, language, and decision-making ability?"*, with 2 people from group B (4.9%) to select *"No"* and 17 people from group A (100%) choosing *"Yes".* The ways to preserve memory, language and ability to make decisions described by group A were mainly reading, playing and living with other people. Group B referred exercises (mental and physical), talking,

[4] Free translation of Portuguese language

[5] Free translation of Portuguese language

studying, visiting museums, traveling, singing, painting, playing instruments and be calm as well as reading, playing and living with other people as described by group A.

Regarding the topic of share stories, events or experiences approached in both inquiries all people from group A and B chose *"Yes*" to answer the question *"Do you consider that it is important to share your stories and life events with others?"* (first inquiry) and *"Do you consider that sharing experiences in group is beneficial during ageing?"* (final inquiry). When it was asked *"Do you feel that taking notes and recording events helps preserving your memory?"* (final inquiry), only 2 people from group B (4.9%) select *"No"* instead of group A where 13 people (100%) indicated *"Yes"*. In the question *"Do you believe that solving exercises to stimulate your mind works?"* 100% of group A and B chose *"Yes"*.

5.5. Learn + with the Specialist

Learn + with the Specialist was the section dedicated to approach several general themes related to an active and healthy life. The first inquiry focused on Republican National Guard, oral hygiene and ophthalmology (see Annex c). The questions of the final inquiry were about how to avoid falls and fractures, weather and care with some kitchen utensils (see Annex d). This was the section where most doubts were observed both in students from group A and B. However, no significant differences between the groups were found.

In the question *"Do you know if the Republican National Guard has any program that helps older people live more securely?"* (first inquiry), 35.3% from group A and 35.7% from group B answered *"No"* (Figure 8). The people that selected *"Yes"* were asked to specify and here it was found that several people do not know the program. Only 1 person from group B knew the program *"Idosos em Segurança"* explained in page 111 of the book. However, some students from group A and B answered that this program was through visits to people's homes.

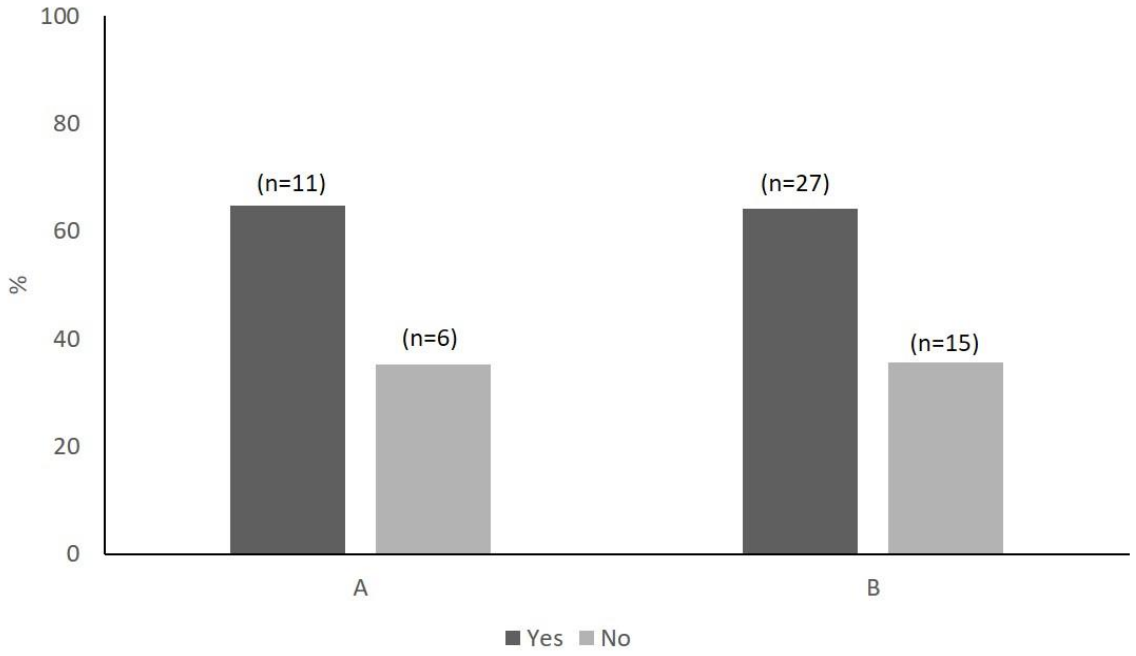

Figure 8: Comparison of the answers from Group A (n=17) – students of literacy classes and Group B (n=47) – students of general classes, to the question *"Do you know if the Republican National Guard has any program that helps older people live more securely?".* No significant differences were found between the groups A and B.

Considering the oral hygiene subject, in the question *"In your oral hygiene, when do you brush your teeth do you also brush your tongue?"* (first inquiry), 17.6% from group A and 36.6% from group B answered *"No"* (Figure 9).

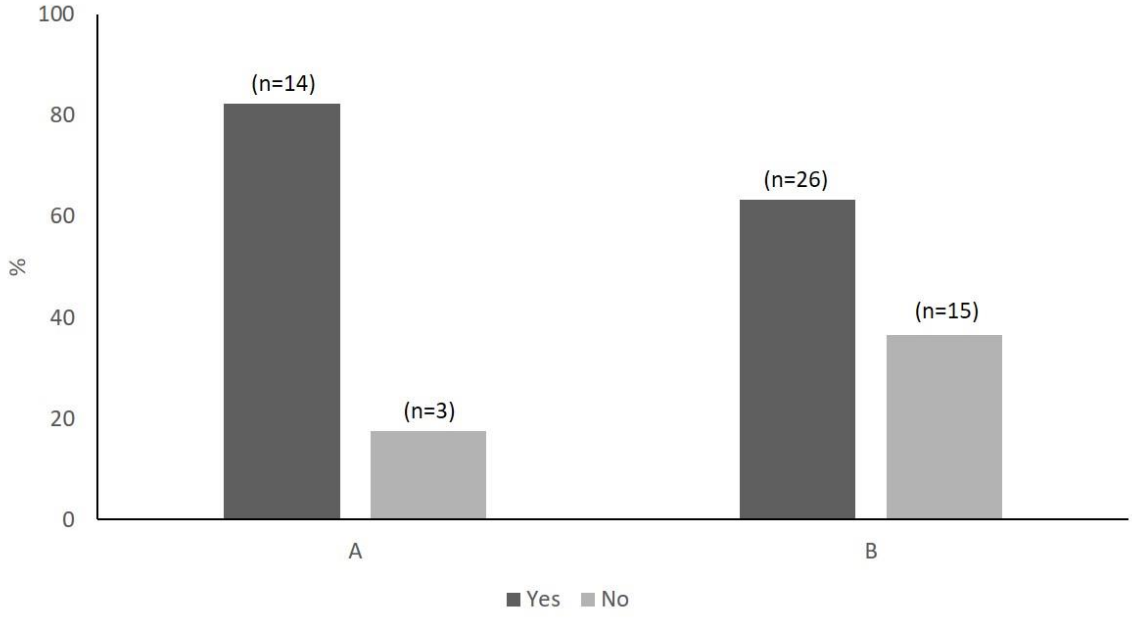

Figure 9: Comparison of the answers from Group A (n=17) – students of literacy classes and Group B (n=47) – students of general classes, to the question *"In your oral hygiene,*

when do you brush your teeth do you also brush your tongue?". No significant differences were found between the groups A and B.

In the question *"Do you consider important go to your ophthalmology doctor frequently even without symptoms?"* (first inquiry), only 1 student from group A selected *"No"*, while all the other chose *"Yes".* This student said *"The doctor told me that there is no cure, so I won't go there anymore."*.

For the final inquiry, in the question *"Do you know how to avoid falls and fractures in your home?"*, 13 people from group B (32.5%) answered *"No"* while 13 people from group A (100%) selected "*Yes*". Students from group A enumerated the following ways to avoid falls and fractures: avoid carpets on the floor, have a rug in the bathtub and avoid furniture in the middle of the rooms. Students from group B also mentioned the same items and added others, such as having support for the bath, not climbing ladders and walk slowly.

In the question *"Do you consider important to be aware of weather forecasts?",* 100% from group A chose *"Yes",* while in the group B only 53.8% considered important to be aware of weather forecasts. All students that selected *"Yes"* mentioned several reasons related to prevention, information and protection to justify the importance of being alert.

The last question was *"Should raw foods and cooked food be handled in the kitchen with the same utensils?",* once again, to the answer "*Yes",* from the group A it was obtained 100% while from the group B only 63.2%.

In the book *"Viver com Saúde depois dos 60 Anos",* the section Learn + with the Specialist includes several general themes, and during the interviews there was a student that highlight one in particular:

"(…) I think the chapter about the importance of socialization and the fight against isolation, as well as the leisure activity was very interesting. Because, for those who are

retired and are locked between 4 walls it is a very big risk factor. I think this chapter is really important."[6]

(student, 83 years old)

5.6. Teach + to the Specialist

In the section Teach + to the Specialist, the aim was to assess the book *"Viver com Saúde depois dos 60 Anos"* in a scale from 1 (very negative answer) to 7 (very positive answer) through several categories such as contents, utility, characteristics, satisfaction and evaluation (see Annex d). The Table 8 in the Annex I, describes the results by groups A and B as well as the total results obtained. Generally, the responses from both groups were similar as happened with the other sections above.

Regarding the contents of the book, the questions were about: the ease of understanding the contents; the interest of the themes; if it would be interesting to have other topics in the book; the accessibility of the language; if the exercises and activities were easy to carry out and if they felt able to complete the 12-week program. In this category all the questions averaged over 5, except for the question *"Would you be interested in other topics in the book?"* with an average of 3.02 ± 2.02.

"(…) (the book) is not written in a complicated way. Because sometimes scientists talk about their area and we do not understand anything of what they mean. But with this book anyone understands what it's written. It is not necessary to have much instruction to get what is written here. Concerning the language it is perfect."[7]

(student, 83 years old)

The utility category was aimed to understand if the book could be useful in people's lives; could help to solve problems/challenges; could be consulted to clarify

[6] Free translation of Portuguese language

[7] Free translation of Portuguese language

doubts about ageing and if it could be used in family. Once again, all the questions integrated in this category got an average over 5 *"(…) I think the book is very useful."*

Concerning the characteristics of the book, the questions were about the letter's size; the illustrations and its weight and size. While students considered the letter size appropriate (4.94 ± 1.71) and the book well illustrated (5.58 ± 1.23), the size and weight of the book received a negative evaluation (2.66 ± 2.01).

"(…) the book is not easy to work with! I had to sit at a table because it is too heavy. It is difficult to handle. I think this is pretty important: it's heavy!"[8]

(student, 70 years old)

About the satisfaction, in the question *"Are you satisfied with this book?"* the average was 5.08 ± 1.49 as well as in the question *"Are you satisfied for having participated in this study?"* the average was 5.41 ± 1.37. Here it is particularly important the integration of illiterate students in the project. Since the focus of this initiative was to evaluate a book, people who did not know how to read or write should be excluded. However, since the beginning, the idea was to approximate the knowledge produced in NOVA Medical School to society by building a connection between the Faculty and the Arroios Academy for the Elderly. Thus, it would not make sense to exclude anyone, especially when the illiteracy is a real problem in Arroios (INE, 2011). More important than people's difficulties in reading and writing, integrating everyone into the project was fundamental.

In the last category of Teach + to the Specialist, in the question *"Do you fell that you have improved your knowledge about habits of an active and healthy life?"* the average was 4.49 ± 1.49. Then, in the question *"Would you like to have contents of the book addresses in your classes at the Arroios Academy for the Elderly?"* the results were similar with an average of 4.85 ± 1.74. Finally, in the question *"Do you recommend this book to others of your age?"* the average was 4.94 ± 1.52.

[8] Free translation of Portuguese language

In summary, the general opinion of students about the book *"Viver com Saúde depois dos 60 Anos"* in a scale from 1 (very negative answer) to 7 (very positive answer) was quite positive, with an average of 5 in almost every question, except concerning the size and the book's weight that obtained a negative evaluation (2.66 ± 2.66).

Besides the evaluation of the book as a vehicle of science communication in the elderly community, it were identified two more important aspects throughout the interviews (see Table 5).

The first one was related to the project itself and its **importance** *("I think that actions of this type or others are very important to us."*); **dynamic** (*The book created a certain dynamic (in the Academy), because the themes were things of the ordinary life."*) and **integration** *("They liked it and I think they are happy to be included in the group. This was certainly good.").*

The second one was associated to the role of **researchers** in the **interaction** with people, in this case with elderly community (*"Researchers should come to people to exchange opinions and to know people's opinions.").* Some suggestions were given by students to complement the book's approach. These suggestions included inviting the book's authors to come and give a lecture about the book and/or to organize an open class with the authors, so people could clarify their specific doubts.

The interview's results demonstrated once again that the education level in the academy is very low *"(…) This here has a low level of education." and "(…) Here we have to put up with very old and very uneducated people."* It is a relevant aspect because illiterate students do not have the opportunity to attend the health classes provided by the Arroios Academy for the Elderly. Thus, the interaction with the practical handbook through the literacy classes was a privileged way to the Group A had access to health contends.

Table 5: Interview's results (n=4) presented by blocks, categories and indicators. The interviews were recorded and transcribed in Portuguese and the indicators were translated to the English language.

Blocks	Categories	Indicators
Project	**Importance**	*"(…) I think that actions of this type or others are very important to us."*
		"(…) I've already seen them with the book in the reading room, I think it's important."
		"(…) I think it was very important and what I have heard from the students is that they are really interested."
	Dynamic	*"(…) the book created a certain dynamic, because the themes were things from the ordinary life and they were effectively awakened for the book"*
		"(…) I think it was an asset to the Academy."
		"(…) It has been curious, because it effectively dynamized."
	Integration	*"(…) They may not even notice, but they are glad to be included. When I stopped and said we were going to see the book they were happy."*
		"(…) Yes, yes, they liked it and I think they are happy to be included in the group. This was certainly good."
Book	**Value**	*"(…) I think the book is very useful."*
		"(…) The way it is done, yes, because it is not done in a complicated way. Because sometimes scientists talk about their areas and we do not understand anything of what they mean. But with this book anyone understands what is written. It is not necessary to have much instruction to understand what is written here. In terms of the language it is perfect."
		"(…) Arouses curiosity."
		(…) After reading this book I could see myself eating salads, which I do not like at all. I started to add turnip greens in the soup. Just yesterday I made a bean's

		soup, which normally I would only do with beans, but I gathered greens to eat the vegetables as indicate in the book. There were a number of things I went through. The issue of water, I did not really drink almost anything, and then I started drinking a lot. And I know there are people who started drinking it as well."
	Theme	*"(…) The theme of food, drinks, walking, gymnastic."*
		"We talked about food, drink, exercises to do."
		"(…) For example, one of the things it was water during the meal, from what I heard we should not drink water during the meal. Another thing was mixing the fruits. The book advises that we can eat various kinds of fruit. The part of the exercises is very interesting for those who do not attend a gymnasium."
		"(…) I opened the book and found that these recipes were charming. I've tried the "feijoada". Here we have exercises we can do at home."
		"(…) I find the chapter about the importance of socialization and the fight against isolation as well as the leisure activity very interesting. Because those who are retired and are locked between 4 walls, it is a very big risk factor. I find this chapter very important."
		"(…) A few days ago, I was laughing with my husband because the exercises we did at the gym could have been done at home."
		"(…) The question of eggs, I also have a doctor who told me to eat eggs."
	Weight	*"(…) For me it is very heavy."*
		"(…) Now what I've told you in this field is that the book is not easy to work with, nothing! Because to work with it I had to sit at a table since it is heavy. It is difficult to

		handle. I think this is pretty important: it's heavy."
	Comprehension	*"(…) I think the book is very well done."*
		"(…) I thought the book is well written."
Academy	**Education level**	*"(…) In this Academy we have all kinds of people, some of them with many years of education and others that do not even have the fourth class. However, I was very surprised when I found out that most of my classmates only had the fourth class."*
		"I have the 4th class."
		"(…) This here has a low level of education."
		"(…) Here we have to put up with very old and very uneducated people."
Researcher	**Interaction**	*"(…) if specialized people came here to explain, it would have been better than reading the book."*
		"(…) It's easier, the researchers come here."
		"(…) researchers should come to people to exchange opinions and to know people's opinions."
		"(…) If a scientist comes to give a lecture on a theme, or better, open to any question, for example even about this book."
		"(…) It would be better if scientists came here, but I think it is asking too much, because they have a lot to do and they cannot waste time."
		"(…) An open class for people to ask."
		"(…) The lectures are a proposal that they could make, and we would like it very much."

5.7. Connect + with the Science Communicator

In this project the science communicator played a key role in bridging the biomedical community from NOVA Medical School and the elderly community from Arroios. These two different communities were connected because the science communicator identified the needs of each community and created an opportunity to establish collaborative dynamics.

As described by Burns et al., 2003, science communication can be defined as the use of appropriate skills, media, activities or dialogue to produce personal responses to understand science. In this perspective, science communicators are defined as mediators because they have the capacity to use their skills; provide the materials; promote activities and discuss the issues (Burns et al., 2003).

During the development of the present work, the science communicator was the responsible to implement the project and follow all the steps. It allowed a personal interaction with the groups A and B which that was important to achieve the project's goals, mainly because the elderly community felt integrated in the project. Another important aspect was related to the idea of elderly students helping researches to improve their investigation in the ageing and health field.

The elderly academies or senior centres generally offer a diverse programming according to the needs of their populations (Cannon, 2017). Several studies have shown that the participation in senior centres is associated with a positive life satisfaction (Kirk & Alessi, 2002; Pardasani, 2004). Moreover, the social interactions and relationships created at this places can help to combat social isolation (Aday, Kehoe, & Farney, 2006) which has been connected to a decrease in health outcomes (Holt-Lunstad et al., 2010).

The present initiative contributed to evaluate the handbook *"Viver com Saúde depois dos 60 anos"*, to promote healthy behaviours and establish a collaborative dynamic between the communities as well as to contribute to an active and healthy ageing in the elderly students from Arroios academy. On the other hand, the researchers from EpiDoC Unit received the feedback from the target public with suggestions to improve the book. At the level of Higher Education Institution, this

project promoted an affirmation of NOVA Medical School as an institution that pays attention to people residing around it.

Conclusion

The main focus of this thesis is to illustrate the connection between the knowledge produced at NOVA Medical School in the ageing field and the elderly community from Arroios through a case study. To promote this link, a collaborative research approach tried to answer the question – Is the book *"Viver com Saúde depois dos 60 anos"* a good science communication vehicle for the elderly population?

The results obtained from the inquiries and interviews demonstrated that the contents presented in the book were themes already known by the students from group A (students from literacy classes) and group B (students from general classes). Basically, the students answered correctly to most of the questions in all sections from nutrition to mental health, with an exception for the question related to the salt *versus* aromatic herbs consume. In this topic it was observed that students from literacy classes selected salt instead of aromatic herbs as the best option for seasoning food. However, it was verified during informal conversations with students, even though they knew the best practices to promote an active and healthy life, most people do not behave accordingly to them in their daily lives.

The section where most doubts and wrong answers were verified, both in the first and final inquiry, was the section dedicated to general themes, probably because over there, there were the less familiar subjects to people.

Regarding the book's assessment by students, according to a scale from 1 (very negative response) to 7 (very positive response), the global result was quite positive since most of the answers had an average of 5, excepting the topic related to the book's size and weight. This was the main negative point of the book and the aspect that all students would like to see improved in the future.

Therefore, the results from the inquiries demonstrate that the book had a littler impact on people's knowledge. However, throughout the interview results it was verified that the book *"Viver com Saúde depois dos 60 Anos"* promoted healthy behaviours in students, particularly in the nutrition area. There were some students that changed their habits according to the book's explanations and this was definitely a great achievement to this initiative.

In a perspective of collaborative research, the duration of the present thesis does not allow to end this approach. To conclude this work the researchers from EpiDoC Unit need to evaluate the results, as well as the suggestions, and give feedback to Arroios Academy for the Elderly. This is unfortunately one weakness from the collaborative research. The time needed to form partnerships, implement the project, collect and analyse the results were a great challenge. On the other hand, the relevancy to local community, the connection between the community and the faculty as well as the results used for a sustainable change, are the strengths of this approach.

The next step would have been organizing a meeting between EpiDoC researchers and the students from Arroios Academy for the Elderly to present the results and to discuss book's contents.

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List of Abbreviations

CBPR: Community-Based Participatory Research

CBR: Community-Based Research

CEDOC: Chronic Diseases Research Centre

CUE: Community-University Engagement

HEIs: Higher Education Institutions

NMS: NOVA Medical School

TOXOMICS: Centre for Toxicogenomics and Human Health

WHO: World Health Organization

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Annex a

TERMO DE CONSENTIMENTO INFORMADO

Título do estudo: Investigação Colaborativa: Um estudo de caso entre a Comunidade Biomédica da NOVA Medical School e a Comunidade Sénior da Freguesia de Arroios

No âmbito da realização da dissertação de mestrado da aluna Ana Rodrigues Barros em Comunicação de Ciência, pela Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa, é convidado(a) a participar voluntariamente num estudo que pretende avaliar o livro "Viver com Saúde depois dos 60 Anos" como uma ferramenta de transmissão de conhecimento em várias temáticas na área da saúde para a comunidade sénior. De forma a assegurar a sua participação informada, deve perceber quais são os objetivos desta investigação e colocar todas as suas questões para tomar uma decisão consciente e ponderada. As informações necessárias estão neste documento que se designa por termo de consentimento informado, que deve ler atentamente e colocar as questões que desejar.

Irá receber uma cópia deste termo de consentimento informado para rever com calma e, se desejar, solicitar o aconselhamento de familiares ou amigos.

Depois de perceber a finalidade deste estudo e se desejar participar, ser-lhe-á solicitado que assine este termo.

Contextualização e finalidade do estudo

A NOVA Medical School|Faculdade de Ciências Médicas é uma Faculdade de Medicina situada no Campo Mártires da Pátria que pertence à Freguesia de Arroios. Para além de ser reconhecida pela sua qualidade de ensino e pela formação de médicos, esta Faculdade dedica também muita atenção à investigação na área da saúde. A Unidade EpiDoC constitui um dos grupos de investigação da NOVA Medical School|Faculdade de Ciências Médicas que se dedica a estudar os aspetos relacionados com a saúde e estilos de vida nos idosos portugueses. Esta equipa lançou recentemente o livro "Viver

com Saúde depois dos 60 Anos", um livro prático que pretende promover estilos de vida saudáveis e contribuir para melhorar a saúde das pessoas mais velhas.

Com o presente estudo, o objetivo é perceber se o livro "Viver com Saúde depois dos 60 Anos" funciona como um veículo de transmissão de conhecimento para a promoção de hábitos de vida saudável na população sénior. Assim, pretende-se avaliar este livro junto do público-alvo para o qual ele foi desenhado e promover uma aproximação da NOVA Medical School|Faculdade de Ciências Médicas através da Unidade EpiDoC às pessoas que frequentam a Academia Sénior no âmbito das "Atividades de Envelhecimento Ativo e Saudável" da Junta de Freguesia de Arroios.

Se decidir participar neste estudo, serão realizados os seguintes procedimentos:

1. Realização de 1 inquérito inicial para avaliar os seus conhecimentos relativos aos hábitos de promoção de uma vida ativa e saudável antes de conhecer o livro "Viver com Saúde depois dos 60 Anos". É esperado que a este inquérito respondam todas as pessoas que participam nas aulas da Academia Sénior da Junta de Freguesia de Arroios;
2. Disponibilização do livro "Viver com Saúde depois dos 60 Anos" pelas pessoas que responderam ao inquérito inicial;
3. Realização de algumas entrevistas para monitorização da interação dos alunos com o livro e os seus conteúdos;
4. Realização de 1 inquérito final para avaliar os conhecimentos relativos aos hábitos de promoção de uma vida ativa e saudável depois da oportunidade de conhecer o livro "Viver com Saúde depois dos 60 Anos". Além disso, neste inquérito será ainda avaliado o livro do ponto de vista dos seus conteúdos, utilidade, características físicas, do grau de satisfação que proporcionou e uma avaliação global.

Potenciais benefícios da sua participação

Ao aceitar participar neste estudo irá ter acesso ao livro "Viver com Saúde depois dos 60 Anos", o que lhe irá proporcionar a leitura de vários conteúdos relacionados com boas práticas para uma vida ativa e saudável. Além disso, o livro contém o Programa

Viver com Saúde, um programa de 12 semanas que engloba receitas e dicas de culinária, exercícios físicos que poderá realizar em sua casa sem custos, exercícios para manter o seu cérebro ativo e ainda importantes informações sobre vários temas como a socialização, a segurança, visão, audição entre tantos outros.

Participação/Abandono voluntário

A sua participação neste estudo é voluntária, podendo a qualquer momento recusar-se ou interromper a participação sem nenhuma penalização por esse facto.

Confidencialidade

Todas as informações recolhidas durante este estudo servem para a realização da dissertação de mestrado da aluna Ana Rodrigues Barros, no Mestrado de Comunicação de Ciência da Faculdade e Ciências Sociais e Humanas da Universidade Nova de Lisboa, que será publicada em repositório e terá acesso aberto. As respostas aos inquéritos são anónimas pelo que a sua identidade nunca será revelada em nenhuma circunstância. Os resultados deste estudo poderão também ser apresentados em congressos e/ou publicações.

Questões

Em caso de qualquer dúvida ou questão sobre este estudo, contactar a aluna responsável por esta investigação:

Ana Rodrigues Barros
e-mail: ana.barros@nms.unl.pt
Telemóvel: 911142729

Só deve assinar este consentimento informado depois de ter tido oportunidade de esclarecer todas as suas dúvidas e ter recebido resposta às suas questões.

Annex b

Declaração de Consentimento Informado

Título do estudo: Investigação Colaborativa: Um estudo de caso entre a Comunidade Biomédica da NOVA Medical School e a Comunidade Sénior da Freguesia de Arroios

Fui informado de que a minha participação neste estudo é voluntária e que por isso posso recusar-me a participar, ou que posso retirar-me deste estudo a qualquer momento sem que qualquer tipo de penalização por esse facto.

Compreendi toda a informação sobre o estudo, presente no termo de consentimento informado, nomeadamente os objetivos e a descrição dos procedimentos, e foi-me dada oportunidade de fazer perguntas, sendo que todas as minhas dúvidas foram esclarecidas.

Autorizo a utilização dos meus dados para fins desta investigação conforme descrito neste documento.

Irei receber uma cópia deste documento assinado e datado por mim e pela aluna Ana Rodrigues Barros responsável por esta investigação, que deverei guardar até ao final do estudo.

Assim, aceito participar de livre vontade no estudo acima mencionado.

_____	____ /___ /___	_____
Nome do participante	Data	Assinatura

_____	____ /___ /___	_____
Nome da pessoa que obteve o consentimento	Data	Assinatura

Annex c

Inquérito

O presente inquérito faz parte de uma investigação integrada no Mestrado em Comunicação de Ciência da Faculdade de Ciências Sociais e Humanas da Universidade Nova de Lisboa, e aborda temas relacionados com a promoção de hábitos de uma vida ativa e saudável na comunidade sénior. O inquérito salvaguarda o anonimato dos participantes.

I - Informações Gerais

Idade: _____ **Grau de escolaridade:_____**

Sexo

☐ Masculino
☐ Feminino

Frequenta as aulas de Saúde e/ou Saúde - Histórias com Vida da Academia Sénior da Junta de Freguesia de Arroios?

☐ Sim
☐ Não

II - Cantinho + Nutrição

1. **Sabe quantos copos de água deve beber por dia?**
   ☐ Sim
   ☐ Não
   Se sim, quantos? _____

2. **Qual a melhor opção para temperar a comida?**
   ☐ Sal
   ☐ Ervas aromáticas

3. **O que se deve consumir em maior quantidade?**
   ☐ Produtos vegetais
   ☐ Produtos de origem animal

III - Mexa-se + em sua Casa

4. **Considera que a prática de exercício físico tem benefício para a sua saúde?**
   ☐ Sim
   ☐ Não

5. **Acha que pode realizar exercício físico em casa recorrendo a utensílios que já tem disponíveis?**
   - ☐ Sim
   - ☐ Não

6. **Relaciona a prática de exercício físico com uma melhor noite de sono?**
   - ☐ Sim
   - ☐ Não

IV - Cérebro + Ativo

7. **Sente que se usar a sua mente de forma ativa, terá mais facilidade na resolução de problemas do dia a dia?**
   - ☐ Sim
   - ☐ Não

8. **Acha que existem formas de preservar a sua memória, linguagem e capacidade de tomar decisões?**
   - ☐ Sim
   - ☐ Não

   Se sim, quais:_____

9. **Considera que é importante partilhar as suas histórias e acontecimentos da sua vida com outras pessoas?**
   - ☐ Sim
   - ☐ Não

V - Saiba + com o Especialista

10. **Sabe se a Guarda Nacional Republicana (GNR) tem algum programa que ajude os idosos a viver com mais segurança?**
    - ☐ Sim
    - ☐ Não

    Se sim, qual: _____

11. **Na sua higiene oral, quando escova os dentes também escova a língua?**
    - ☐ Sim
    - ☐ Não

12. **Considera importante ir a consultas regulares de oftalmologia, mesmo sem ter sintomas?**
    - ☐ Sim
    - ☐ Não

Muito obrigada pela sua participação!

Annex d

Inquérito

Caro aluno da Academia Sénior da Junta de Freguesia de Arroios, após o preenchimento do primeiro inquérito antes de conhecer o livro "Viver com Saúde depois dos 60 anos", venho agora solicitar o preenchimento do presente inquérito sobre os conhecimentos que adquiriu relacionados com a promoção de hábitos de uma vida ativa e saudável, e a sua opinião sobre o livro. O inquérito salvaguarda o anonimato dos participantes.

Por favor, só preencha este inquérito se anteriormente já:

- Assinou o consentimento informado
- Preencheu o inquérito inicial
- Tomou contacto com o livro "Viver com Saúde depois dos 60 anos"

I - Informações Gerais

Local de nascimento: _____

Atual local de residência: _____ **Idade:** _____

Grau de escolaridade: _____

Sexo

☐ Masculino
☐ Feminino

Vive sozinho?

☐ Sim
☐ Não

II – Viver com Saúde depois dos 60 anos

1. **Como teve acesso ao Livro "Viver com Saúde depois dos 60 anos?"**
   ☐ Estava disponível na sala de leitura Clodomiro Alvarenga para consulta
   ☐ Tive oportunidade de levar o livro para casa para ler
   ☐ O livro foi abordado durante as aulas da Academia Sénior
   ☐ Outro, qual? _____

2. **Quanto tempo dedicou à leitura do Livro "Viver com Saúde depois dos 60 anos"?**

_____

3. **De que forma realizou a leitura do livro?**
   ☐ Li o livro na totalidade
   ☐ Selecionei os temas em que tinha mais interesse
   ☐ Selecionei os conteúdos onde tinha dúvidas
   ☐ Escolhi a leitura dos temas com base nas ilustrações
   ☐ Tive acesso ao livro, mas não o li
   ☐ Outro, qual? _____

III - Cantinho + Nutrição

4. **Como se deve iniciar o almoço e o jantar?**
   - ☐ Com sopa rica em hortaliças e legumes
   - ☐ Com o prato principal

5. **Quais são as bebidas mais benéficas para a sua saúde?**
   - ☐ Refrigerantes e outras bebidas açucaradas
   - ☐ Água

6. **Que gordura deve ser usada na preparação dos alimentos?**
   - ☐ Azeite
   - ☐ Margarina
   - ☐ Manteiga
   - ☐ Banha

IV - Mexa-se + em sua Casa

7. **Considera que a prática de exercício físico pode melhorar as suas articulações?**
   - ☐ Sim
   - ☐ Não

8. **Quais são os utensílios que tem em sua casa que o podem ajudar a praticar exercício físico e como?**

   _____
   _____
   _____

9. **Em que tarefas do dia a dia a prática de exercício físico o pode ajudar?**

   _____
   _____
   _____

V - Cérebro + Ativo

10. **Sente que tomar notas e registar acontecimentos ajuda a preservar a sua memória?**
    - ☐ Sim
    - ☐ Não

11. **Acredita que a resolução de exercícios para estimular a sua cabeça funciona?**
    - ☐ Sim
    - ☐ Não

12. **Considera que a partilha de experiências em grupo é benéfica ao longo do envelhecimento?**

☐ Sim

☐ Não

VI - Saiba + com o Especialista

13. Sabe como deve evitar quedas e fraturas em sua casa?

☐ Sim

☐ Não

Se sim, como:

_____

_____

_____

14. Considera importante estar a par das previsões meteorológicas do tempo?

☐ Sim

☐ Não

Se sim, porquê?

_____

_____

_____

15. Os alimentos crus e os alimentos cozinhados devem ser manipulados na cozinha com os mesmos utensílios (por exemplo facas ou tábuas de corte)?

☐ Sim

☐ Não

VII - Ensine + ao Especialista

Responda, por favor, às seguintes questões, assinalando com X, sendo que **1 é uma resposta muito negativa** e **7 é uma resposta muito positiva**.

Questões	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Conteúdos							
Os conteúdos abordados no livro são fácies de compreender?							
As temáticas presentes no livro são interessantes?							
Estaria interessado em ver outros temas no livro?							
Quais?							
A linguagem usada no livro é acessível?							
Os exercícios e atividades propostas são fácies de realizar?							

Acha que será capaz de realizar o programa de exercícios das 12 semanas?							
Utilidade							
Acredita que este livro é útil na sua vida?							
Acha que este livro o pode ajudar a resolver algum desafio/problema do seu quotidiano/da sua vida?							
Sente que pode consultar este livro para esclarecer dúvidas sobre o envelhecimento?							
Acha que este livro pode ser usado com a sua família?							
Características							
Considera o tamanho de letra do livro adequado?							
Acha que o livro está bem ilustrado?							
As ilustrações dos exercícios físicos auxiliam o leitor a realizá-los?							
O tamanho e peso do livro é apropriado?							
Satisfação							
Está satisfeito com este livro?							
Está satisfeito por ter participado neste estudo?							
Avaliação							
Sente que melhorou os seus conhecimentos sobre os hábitos de uma vida ativa e saudável?							
Gostava de ver abordados os conteúdos do livro nas suas aulas na Academia Sénior?							
Aconselha este livro a outras pessoas da sua idade?							

Deixe um comentário sobre a sua participação neste estudo e sobre a sua interação com o livro "Viver com Saúde depois dos 60 anos":

_____
_____
_____
_____
_____

Data: _____

Muito obrigada pela sua participação!

Annex e

Guião para as entrevistas

1) Professoras das Aulas de Alfabetização

BLOCOS	OBJETIVOS	PERGUNTAS
A **Legitimidade da entrevista**	Informar que a entrevista está inserida no âmbito de uma tese de mestrado que pretende avaliar o livro *"Viver com Saúde depois dos 60 Anos",* como um veículo de comunicação de ciência. Confirmar se preencheu o inquérito inicial.	**1.** Posso gravar a entrevista e tirar notas?
B **Dados**	Recolher dados relevantes para a interpretação das respostas.	**2.** Pode-me dizer o seu nome e idade? **3.** Há quanto tempo é professora das aulas de alfabetização na Academia Sénior? **4.** Frequenta outras aulas da Academia como aluna? **5.** Se sim, quais são?
C **Livro**	Captar a opinião sobre a utilização do livro nas aulas de Saúde.	**6.** Qual foi a sua reação à sugestão de utilizar este livro nas suas aulas? **7.** Como é que adaptou a utilização deste livro nas aulas? **8.** Pode-me dar exemplos de exercícios que fez com os alunos? **9.** Quais foram as temáticas mais abordadas nas aulas e como foi feita essa seleção? Foi a professora que escolheu, ou foram os alunos que pediram? **10.** Sente que os alunos conseguem aprender conteúdos relacionados com saúde enquanto desenvolvem as suas capacidades de escrita e leitura? **11.** Acha que os alunos estão a aprender algo que os pode ajudar no dia a dia?

		12. Quais são as principais dificuldades da utilização deste livro nas aulas? **13.** Quais são as principais vantagens de falar de saúde nas aulas de alfabetização? **14.** Considera os conteúdos difíceis para explicar aos seus alunos? **15.** Qual é a perceção que tem relativamente ao interesse deles neste livro? **16.** Sentiu que os alunos aprenderam sobre saúde durante as suas aulas? **17.** Acha que faz sentido usar este livro como material escolar nas suas aulas? Ou em outras aulas da Academia Sénior? **18.** A maioria das pessoas responderam de forma correta às perguntas, no entanto tive oportunidade de verificar que existem muitas dúvidas nos conteúdos. Além disso, os alunos identificam a forma correta de agir, mas não o fazem. Na sua opinião, o que poderia ajudar a mudar isso?
D Comunicação de Ciência	Avaliar o interesse em projetos de comunicação de ciência que têm como objetivo aproximar os cientistas das pessoas.	**19.** Esta ação surgiu do facto de não excluir ninguém do projeto. Considera que foi importante incluir os alunos de alfabetização nesta iniciativa? **20.** Acha que é importante que os cientistas estejam mais próximos da população? **21.** Considera este livro como uma boa forma dos cientistas passarem o seu conhecimento para a sociedade? **22.** Que outras formas podem existir para aproximar os cientistas das pessoas?

2) Alunas das Aulas de Alfabetização

BLOCOS	OBJETIVOS	PERGUNTAS
A **Legitimidade da entrevista**	Informar que a entrevista está inserida no âmbito de uma tese de mestrado que pretende avaliar o livro *"Viver com Saúde depois dos 60 Anos",* como um veículo de comunicação de ciência. Confirmar se preencheu o inquérito inicial.	**1.** Posso gravar a entrevista e tirar notas?
B **Dados**	Recolher dados relevantes para a interpretação das respostas.	**2.** Pode-me dizer o seu nome e idade? **3.** Onde é que nasceu e onde vive agora? Vive sozinha ou acompanhada? **4.** Há quanto tempo frequenta as aulas de alfabetização na Academia Sénior? **5.** Frequenta outras aulas da Academia? **6.** Se sim, quais são?
C **Livro**	Captar a opinião sobre a utilização do livro nas aulas de Saúde.	**7.** Qual foi a sua reação à sugestão de utilizar este livro nas aulas? **8.** Como é que a Professora adaptou a utilização do livro nas aulas? **9.** Pode-me dar exemplos de exercícios que fizeram nas aulas? **10.** Quais foram as temáticas mais abordadas nas aulas e como foi feita essa seleção? Foi a professora que escolheu, ou foram os alunos? **11.** Conseguiu aprender sobre saúde enquanto estava a desenvolver as suas capacidades de escrita e leitura? **12.** Acha que aprendeu alguma coisa que o pode ajudar no seu dia a dia? Pode-me dar um exemplo? **13.** Considera os conteúdos difíceis para aprender nas aulas? **14.** Acha que faz sentido usar este livro como material escolar nas aulas da Alfabetização? Ou em outras aulas

		da Academia Sénior? **15.** A maioria das pessoas responderam de forma correta às perguntas, no entanto tive oportunidade de verificar que existem muitas dúvidas nos conteúdos. Além disso, os alunos identificam a forma correta de agir, mas não o fazem. Na sua opinião, o que poderia ajudar a mudar isso? **16.** Gostou desta experiência?
D **Comunicação de Ciência**	Avaliar o interesse em projetos de comunicação de ciência que têm como objetivo aproximar os cientistas das pessoas.	**17.** Esta ação surgiu do facto de não excluir ninguém do projeto. Considera que foi importante incluir os alunos de alfabetização nesta iniciativa? **18.** Acha que é importante que os cientistas estejam mais próximos da população? **19.** Considera este livro como uma boa forma dos cientistas passarem o seu conhecimento para a sociedade? **20.** Que outras formas podem existir para aproximar os cientistas das pessoas?

3) Alunos da Academia Sénior

BLOCOS	OBJETIVOS	PERGUNTAS
A **Legitimidade da entrevista**	Informar que a entrevista está inserida no âmbito de uma tese de mestrado que pretende avaliar o livro *"Viver com Saúde depois dos 60 Anos"*, como um veículo de comunicação de ciência. Confirmar se preencheu o inquérito inicial.	**1.** Posso gravar a entrevista e tirar notas?
B **Dados**	Recolher dados relevantes para a	**2.** Pode-me dizer o seu nome e idade? **3.** Há quanto tempo frequenta as

	interpretação das respostas.	aulas na Academia Sénior? **4.** Quais são as aulas que frequenta na Academia?
C **Livro**	Captar a opinião sobre a utilização do livro nas aulas de Saúde	**5.** Qual foi a sua reação ao desafio de ler este livro e depois poder dar a sua opinião sobre ele? **6.** Ficou contente por integrar este estudo, ou foi indiferente? Sente que está a ajudar a gerar mais conhecimento para a faculdade? **7.** Como é que teve contacto com o livro? Consultou o livro na sala de leitura ou levou para casa? **8.** Quanto tempo dedicou à leitura do livro? **9.** Quais foram os critérios para ler o livro? Leu na totalidade ou escolheu temas específicos? Pode-me falar um pouco sobre essas decisões? **10.** Quais foram as temáticas que gostou mais no livro? E as que gostou menos? **11.** Aprendeu alguma coisa que ainda não sabia e que a pode ajudar no dia a dia? **12.** Acha que faz sentido usar este livro como material escolar nas aulas da Academia Sénior? Em que aulas? **13.** A maioria das pessoas responderam de forma correta às perguntas, no entanto tive oportunidade de verificar que existem muitas dúvidas nos conteúdos. Além disso, os alunos identificam a forma correta de agir, mas não o fazem. Na sua opinião, o que poderia ajudar a mudar isso? **14.** Qual é a sua opinião de uma forma geral sobre este livro?
D **Comunicação de Ciência**	Avaliar o interesse em projetos de comunicação de ciência que têm como objetivo aproximar os cientistas das pessoas.	**15.** Acha que é importante que os cientistas estejam mais próximos da população? **16.** Considera este livro como uma boa forma dos cientistas passarem o seu conhecimento para a sociedade?

		17. Qual é a sua opinião relativamente a uma relação de maior proximidade entre a Faculdade de Medicina aqui em Arroios e os alunos da Academia Sénior? **18.** Que outras formas podem existir para aproximar os cientistas das pessoas?

Annex f

Table 6: First inquiry answers summarized by absolute (n) and relative (%) frequencies. Comparison of Group A (n=17) - students from literacy classes versus Group B (n=47) – students from general classes, against qualitative variables were tested using Chi-Square test or Fisher test (where applicable).

Nutrition, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you know how many glasses of water should you drink per day?, 63 (98,4%)			
Yes	17 (100%)	40 (87%)	57 (90.5%)
No	0 (0%)	6 (12%)	6 (9.55%)
Total	17 (27%)	46 (73%)	63 (100%)
What is the best option for seasoning food?, 62 (96,9%)			
Salt	13 (76.5%)	6 (13.3%)	19 (30.6%)
Aromatic herbs	4 (23.5%)	39 (86.7%)	43 (69.4%)
Total	17 (27.4%)	45 (72.6%)	62 (100%)
p-value		< 0.001 (FT)[9]	
What should be consumed in greater quantity?, 64 (100%)			
Vegetables	13 (76.5%)	47 (100%)	60 (93.8%)
Animal origin	4 (23.5%)	0 (0%)	4 (6.3%)
Total	17 (26.6)	47 (73.4%)	64 (100%)
Physical Exercice, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you consider that the practice of physical exercise has a benefit to your health?, 63 (98,4%)			
Yes	17 (100%)	45 (97.8%)	62 (98.4%)
No	0 (0%)	1 (2.2%)	1 (1.6%)
Total	17 (27%)	46 (73%)	63 (100)
Do you think that physical exercise can be performed at your home using tools already available?, 57 (89.1%)			
Yes	15 (93.8%)	37 (90.2%)	52 (91.2%)
No	1 (6.3%)	4 (9.8%)	5 (8.8%)
Total	16 (28.1%)	41 (71,9%)	57 (100%)

[9] Fisher test

p-value		>0.999 (FT)[10]	
Do you relate the practice of physical exercise to a better night's sleep?, 57 (89.1%)			
Yes	17 (100%)	33 (82.5%)	50 (87.7%)
No	0 (0%)	7 (15.5%)	7 (12.3%)
Total	17 (28.8%)	40 (70.2%)	57 (100%)

Mental Health, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you feel that if you use your mind actively, it will be easier to solve day-to-day problems?, 58 (90.6%)			
Yes	17 (100%)	40 (97.6%)	57 (98.3%)
No	0 (0%)	1 (2.4%)	1 (1.7%)
Total	17 (29.3%)	41 (70.7%)	58 (100%)
Do you think there are ways to preserve your memory, language, and decision-making ability?, 58 (90.6%)			
Yes	17 (100%)	39 (95.1%)	56 (96.6%)
No	0 (0%)	2 (4.9%)	2 (3.4%)
Total	17 (29.3%)	41 (70.7%)	58 (100%)
Do you consider that it is important to share your stories and life events with others?, 58 (90.6%)			
Yes	16 (94.1%)	39 (95.1%)	55 (94.8%)
No	1 (5.9%)	2 (4.9%)	3 (5.2%)
Total	17 (29.3%)	41 (70,7%)	58 (100%)
p-value		>0.999 FT[11]	

Curiosities, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you know if the Republican National Guard has any program that helps elderly people live more securely?, 59 (92.2%)			
Yes	11 (64.7%)	27 (64.3%)	38 (64.4%)
No	6 (35.3%)	15 (35.7%)	21 (35.6%)
Total	17 (28.8%)	42 (71.2%)	59 (100%)

[10] Fisher test

[11] Fisher test

p-value		0.976 CS[12]	
In your oral hygiene, when do you brushing your teeth do you also brush your tongue?, 58 (90.6%)			
Yes	14 (82.4%)	26 (63.4%)	40 (69%)
No	3 (17.6%)	15 (36.6%)	18 (31%)
Total	17 (29.3%)	41 (70.7%)	58 (100%)
p-value		0.217 FT[13]	
Do you consider important go to your ophthalmology doctor frequently even without symptoms?, 58 (90.6%)			
Yes	16 (94.1%)	41 (100%)	57 (98.3%)
No	1 (5.9%)	0 (0%)	1 (1.7%)
Total	17 (29.3%)	41 (70.7%)	58 (100%)

[12] Chi-Square test

[13] Fisher test

Annex g

Table 7: Final inquiry answers summarized by absolute (n) and relative (%) frequencies. Comparison of Group A (n= 13) - students from literacy classes versus Group B (n=41) – students from general classes, against qualitative variables were tested using Chi-Square test or Fisher test (where applicable).

Book, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
How did you get access to the book?, 54 (100%)			
Library	0 (0%)	23 (56.10%)	23 (42.6%)
Home	0 (0%)	18 (43.9%)	18 (33.33%)
Classes	13 (100%)	0 (0%)	13 (24.07%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)
How did you read the book?, 49 (90.7%)			
Totality	0 (0%)	18 (48.6%)	18 (36.7%)
By Themes	12 (100%)	9 (24.3%)	21 (42.9%)
For contents where you had doubts	0 (0%)	2 (5.4%)	2 (4.1%)
By the illustrations	0 (0%)	7 (18.9%)	7 (14.3%)
I did not read	0 (0%)	1 (2.70%)	1 (2%)
Total	12 (24.5%)	37 (75.5%)	49 (100%)
Nutrition, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
How should we start lunch and dinner?, 51 (94,4%)			
With soup rich in vegetables and veggies	12 (100%)	37 (94.9%)	49 (96.1%)
With the main food dish	0 (0%)	2 (5.1%)	2 (3.9%)
Total	12 (23.4%)	39 (76.5%)	51 (100%)
What are the most beneficial drinks for your health?, 54 (100%)			
Soft drinks and other sugary drinks	0 (0%)	1 (2.4%)	1 (1.9%)
Water	13 (100%)	40 (97.6%)	53 (98.1%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)
p-value			
Which fat should be used in food preparation?, 54 (100%)			
Olive oil	13 (100%)	41 (100%)	54 (100%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)
Physical Exercice, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you think that physical exercise can improve your joints?, 54 (100%)			
Yes	13 (100%)	40 (97.6%)	53 (98.1%)
No	0 (0%)	1 (2.4%)	1 (1.9%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)

Mental Health, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you feel that taking notes and recording events helps preserving your memory?, 54 (100%)			
Yes	13 (100%)	39 (95.1%)	52 (96.3%)
No	0 (0%)	2 (4.9%)	2 (3.7%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)
Do you believe that solving exercises to stimulate your head works?, 54 (100%)			
Yes	13 (100%)	41 (100%)	54 (100%)
Total	13 (24.1%)	41 (75.9%)	54 (100%)
Do you consider that sharing experiences in group is beneficial during ageing?, 53 (98.1%)			
Yes	13 (100%)	40 (100%)	53 (100%)
Total	13 (24.5%)	40 (75.5%)	53 (100%)

Curiosities, n (%)			
	A n (%)	**B n (%)**	**Total (%)**
Do you know how to avoid falls and fractures in your home?, 53 (99.1%)			
Yes	13 (100%)	27 (67.5%)	40 (75.5%)
No	0 (0%)	13 (32.5%)	13 (24.5%)
Total	13 (24.5%)	40 (75.5%)	53 (100%)
Do you consider important to be aware of weather forecasts?, 52 (96.3%)			
Yes	13 (100%)	21 (53.8%)	34 (65.4%)
No	0 (0%)	18 (46.2%)	18 (34.6%)
Total	13 (25.0%)	39 (75%)	52 (100%)
Should raw food and cooked food be handled in the kitchen with the same utensils?, 49 (90.7%)			
Yes	0 (0%)	14 (36.8%)	14 (28.6%)
No	11 (100%)	24 (63.2%)	35 (71.4%)
Total	11 (22.4%)	38 (77.6%)	49 (100%)

Annex h

Table 8: Book assessment by students summarized by average, standard deviation, median, minimum and maximum. Group A (n=13) - students from literacy classes versus Group B (n=41) – students from general classes.

Contents			
	A	**B**	**Total**
Are the contents covered in the book easy to understand?			
N	12 (92.3%)	40 (97.6%)	52 (94.5%)
Average	4.75	5.60	5.40
Standard Deviation	0.45	1.45	1.33
Median	5	6	5
Min	4	1	1
Max	5	6	7
Are the themes in the book interesting?			
N	12 (92.3%)	40 (97.6%)	52 (95.5%)
Average	6	5.68	5.75
Standard Deviation	0.00	1.33	1.17
Median	6	6	6
Min	6	1	1
Max	6	7	7
Would you be interested in other topics in the book?			
N	12 (92.3%)	32 (78%)	44 (80%)
Average	1.75	3.50	3.02
Standard Deviation	1.55	1.98	2.02
Median	1	3	2
Min	1	1	1
Max	5	7	7
Is the language used in the book accessible?			
N	12 (92.3%)	41 (100%)	53 (96.4%)
Average	5.67	5.66	5.66
Standard Deviation	1.07	1.49	1.4
Median	6	6	6
Min	4	1	1
Max	7	7	7
Are the proposed exercises and activities easy to carry out?			
N	12 (92.3%)	41 (100%)	53 (96.4%)
Average	6.17	5.39	5.57
Standard Deviation	0.39	1.46	1.34
Median	6	6	6
Min	1	2	2
Max	7	7	7

Do you think you will be able to complete the 12-week program?			
N	13 (100%)	39 (95.1%)	52 (94.5%)
Average	5.62	4.06	4.46
Standard Deviation	1.04	1.69	1.69
Median	6	4	4
Min	4	1	1
Max	7	7	7

Utility			
	A	**B**	**Total**
Do you believe that this book is useful in your life?			
N	13 (100%)	41 (100%)	54 (100%)
Average	5.69	4.88	5.07
Standard Deviation	1.11	1.42	1.39
Median	6	5	5
Min	4	2	2
Max	7	7	7
Do you think that this book can help you to solve some challenges/problems in your life?			
N	13 (100%)	40 (97.6%)	53 (98.1%)
Average	5.69	4.43	4.74
Standard Deviation	1.11	1.57	1.56
Median	6	4	4
Min	4	1	1
Max	7	7	7
Do you feel you can consult this book to clarify doubts about ageing?			
N	13 (100%)	41 (100%)	54 (100%)
Average	5.62	4.24	4.57
Standard Deviation	1.04	1.80	1.74
Median	6	4	4
Min	4	1	1
Max	7	7	7
Do you think that this book can be used with your family?			
N	13 (100%)	39 (95.1%)	52 (96.3%)
Average	5.85	4.77	5.04
Standard Deviation	0.69	1.66	1.55
Median	6	5	5
Min	5	1	1
Max	7	7	7

Characteristics	A	B	Total
Do you consider the letter size of the book appropriate?			
N	13 (100%)	41 (100%)	54 (100%)
Average	5.85	4.66	4.94
Standard Deviation	0.69	1.84	1.71
Median	6	4	5
Min	5	1	1
Max	7	7	7
Do you think the book is well illustrated?			
N	13 (100%)	40 (97.6%)	53 (98.1%)
Average	4.92	5.48	5.58
Standard Deviation	0.76	1.34	1.23
Median	6	6	6
Min	5	1	1
Max	7	7	7
The illustrations of physical exercises help the reader to perform the activities?			
N	13 (100%)	40 (97.6%)	53 (98.1%)
Average	5.85	5.38	5.49
Standard Deviation	0.69	1.33	1.22
Median	6	6	6
Min	5	2	2
Max	7	7	7
Is the size and weight of the book appropriate?			
N	13 (100%)	40 (97.6%)	53 (98.1%)
Average	2.69	2.65	2.66
Standard Deviation	1.31	2.21	2.01
Median	2	1.5	2
Min	2	1	1
Max	5	7	7

Satisfaction	A	B	Total
Are you satisfied with this book?			
N	12 (92.3%)	41 (100%)	53 (98.1%)
Average	6.08	4.78	5.08
Standard Deviation	0.90	1.51	1.49
Median	6	5	5
Min	5	1	1
Max	7	7	7
Are you satisfied for having participated in this study?			

N	11 (84.6%)	40 (97.6%)	51 (94.4%)
Average	6	5.25	5.41
Standard Deviation	0.89	1.45	1.37
Median	6	5	6
Min	5	1	1
Max	7	7	7

Evaluation			
	A	**B**	**Total**
Do you feel that you have improved your knowledge about habits of an active and healthy life?			
N	12 (92.3%)	39 (95.1%)	51 (94.4%)
Average	4.17	4.59	4.49
Standard Deviation	1.59	1.46	1.49
Median	4	4	4
Min	1	1	1
Max	7	7	7
Would you like to have the contents of the book addressed in your classes at the Senior Academy?			
N	13 (100%)	40 (97.6%)	53 (98.1%)
Average	5.62	4.60	4.85
Standard Deviation	1.39	1.78	1.74
Median	6	5	5
Min	3	1	1
Max	7	7	7
Do you recommend this book to others of your age?			
N	10 (76.9%)	40 (97.6%)	50 (92.6%)
Average	5.30	4.85	4.94
Standard Deviation	1.70	1.48	1.52
Median	6	5	5
Min	3	2	2
Max	7	7	7